The Anomaly of the Fertility Decline in India's Kerala State

A Field Investigation

K. C. Zachariah

WORLD BANK STAFF WORKING PAPERS
Number 700

POPULATION AND DEVELOPMENT SERIES
Number 25

C4401

WORLD BANK STAFF WORKING PAPERS
Number 700

POPULATION AND DEVELOPMENT SERIES
Number 25

The Anomaly of the Fertility Decline in India's Kerala State

A Field Investigation

K. C. Zachariah

The World Bank
Washington, D.C., U.S.A.

HEALTH CEN... LIBRARY

Copyright © 1984
The International Bank for Reconstruction
and Development / THE WORLD BANK
1818 H Street, N.W.
Washington, D.C. 20433, U.S.A.

All rights reserved
Manufactured in the United States of America
First printing October 1984

This is a working document published informally by the World Bank. To present the results of research with the least possible delay, the typescript has not been prepared in accordance with the procedures appropriate to formal printed texts, and the World Bank accepts no responsibility for errors. The publication is supplied at a token charge to defray part of the cost of manufacture and distribution.

The World Bank does not accept responsibility for the views expressed herein, which are those of the authors and should not be attributed to the World Bank or to its affiliated organizations. The findings, interpretations, and conclusions are the results of research supported by the Bank; they do not necessarily represent official policy of the Bank. The designations employed, the presentation of material, and any maps used in this document are solely for the convenience of the reader and do not imply the expression of any opinion whatsoever on the part of the World Bank or its affiliates concerning the legal status of any country, territory, city, area, or of its authorities, or concerning the delimitation of its boundaries, or national affiliation.

The full range of World Bank publications, both free and for sale, is described in the *Catalog of Publications;* the continuing research program is outlined in *Abstracts of Current Studies.* Both booklets are updated annually; the most recent edition of each is available without charge from the Publications Sales Unit, Department T, The World Bank, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A., or from the European Office of the Bank, 66 avenue d'Iéna, 75116 Paris, France.

K. C. Zachariah is senior demographer in the Population, Health, and Nutrition Department of the World Bank.

Library of Congress Cataloging in Publication Data

Zachariah, K. C. (Kunniparampil Curien), 1924-
The anomaly of the fertility decline in India's Kerala State.

(World Bank staff working papers ; no. 700. Population and development series ; # 25)
Bibliography: p.
1. Fertility, Human--India--Kerala. 2. Kerala (India) --Population. I. Title. II. Series: World Bank staff working papers ; no. 700. III. Series: World Bank staff working papers. Population and development series ; # 25.
HB1050.K47Z33 1984 304.6'32'095483 84-22041
ISBN 0-8213-0439-9

WH-130
04701 N84

COMMUNITY HEALTH CELL
LIBRARY
AND
DOCUMENTATION
UNIT

A B S T R A C T

Kerala's fertility declined by more than 35 percent during the decade 1968-78. This was rather unexpected as the population of Kerala is still very poor, with a per capita income less than $200. Why did fertility decline in Kerala in such an unfavorable circumstances? A resolution of this anomaly is the object of this paper.

The study concludes that the fertility decline in Kerala was caused by an optimum sequence of the commonly recognized determinants of fertility trends. The decline began with improvements in health and education, but it gathered momentum as a result of subsequent policy interventions that included an official family planning program, land reforms, wage reforms, and other redistributive policies.

C O N D E N S E

Pendant la période 1968-78, la fécondité a baissé de plus de 35 % dans le Kerala. Cette évolution était assez imprévue, la population du Kerala étant encore très pauvre, avec un revenu par habitant de moins de 200 dollars. Pourquoi la fécondité a-t-elle diminué dans des circonstances aussi peu propices? Telle est la question à laquelle ce document tente de répondre.

L'étude conclut que la baisse de la fécondité dans le Kerala s'explique par une succession optimale de faits dont il est généralement admis qu'ils déterminent les tendances de la fécondité. Le déclin a commencé avec l'amélioration de l'éducation et de la santé, mais il s'est accéléré sous l'effet de mesures prises par la suite par les pouvoirs publics, et notamment de l'adoption d'un programme officiel de planification de la famille, de réformes foncières et salariales et autres mesures de redistribution du revenu.

E X T R A C T O

En el estado de Kerala, la fecundidad declinó en más del 35% durante el decenio de 1968-78. Esta disminución fue más bien inesperada ya que la población de este estado sigue siendo muy pobre, con un ingreso per cápita inferior a US$200. ¿Por qué descendió la fecundidad en circunstancias tan desfavorables? El objetivo de este informe es procurar aclarar esta anomalía.

Se llega a la conclusión de que la declinación de la fecundidad en Kerala fue producida por una secuencia óptima de los determinantes comúnmente reconocidos de las tendencias de fecundidad. Empezó a descender al mejorar la salud y la educación, pero cobró impulso como consecuencia de posteriores medidas de política, entre ellas, un programa oficial de planificación familiar, la reforma de la tenencia de la tierra, reformas salariales y otras políticas relativas a la redistribución.

FOREWORD

This paper is one in a special series of World Bank Staff Working Papers on population change and development. Most of the papers in the series were prepared as background papers for World Development Report 1984. This paper was prepared in connection with a World Bank-supported research project. Like the commissioned background papers, it provides more detailed treatment and documentation of the issues dealt with in Part II of the 1984 Report. The papers in this series cover a range of topics, including the effects of fertility and mortality, the links between population growth and internal and international migration, and the management, financing, and effectiveness of family planning programs. They include several country and regional studies of fertility change and population policy.

The background papers draw on a large number of published and unpublished studies of individual researchers, on Bank policy analysis and research, and on reports of other organizations working on population and development programs and issues. The papers are the work of individuals, and the views and interpretations expressed in them do not necessarily coincide with the views and interpretations of the Report itself.

I hope these detailed studies will supplement World Development Report 1984 in furthering understanding of population and development issues among students and practitioners of development.

Nancy Birdsall
Staff Director
World Development Report 1984

Some of the Papers in the Population and Development Series

Ainsworth, Martha. Family Planning Programs: The Clients' Perspective. World Bank Staff Working Paper no. 676.

Bulatao, Rodolfo A. Expenditures on Population Programs in Major Regions of the Developing World: Current Levels and Future Requirements. World Bank Staff Working Paper no. 679.

Bulatao, Rodolfo A. Reducing Fertility in Developing Countries: A Review of Determinants and Policy Levers. World Bank Staff Working Paper no. 680.

Cain, Mead. Women's Status and Fertility in Developing Countries: Son Preference and Economic Security. World Bank Staff Working Paper no. 682.

Gwatkin, Davidson. Mortality Reduction, Fertility Decline, and Population Growth: Toward A More Relevant Assessment of Relationships Among Them. World Bank Staff Working Paper no. 686.

Herz, Barbara. Official Development Assistance for Population Activities: A Review. World Bank Staff Working Paper no. 688.

McNicoll, Geoffrey. Consequences of Rapid Population Growth: An Overview. World Bank Staff Working Paper no. 691.

Sapir, Andre. Some Aspects of Population Growth, Trade, and Factor Mobility. World Bank Staff Working Paper no. 694.

Standing, Guy. Population Mobility and Productive Relations: Demographic Links and Policy Evolution. World Bank Staff Working Paper no. 695.

Tan, Jee-Peng, and Michael Haines. Schooling and Demand for Children: Some Historical Perspectives. World Bank Staff Working Paper no. 697.

Trussell, James, and Anne R. Pebley. The Potential Impact of Changes in Fertility on Infant, Child, and Maternal Mortality. World Bank Staff Working Paper no. 698.

Zachariah, K.C., and Sulekha Patel. Determinants of Fertility Decline in India: An Analysis. World Bank Staff Working Paper no. 699.

Zachariah, K.C. The Anomaly of the Fertility Decline in India's Kerala State: A Field Investigation. World Bank Staff Working Paper no. 700.

Contents

	Page
Preface	xxiii
Summary and Conclusions	xxv
1. Introduction	1
The Anomaly	1
Conclusions from the Study	3
Policy Implications	5
Part One. Background	8
2. Kerala State: Geographic and Socioeconomic Background	8
Geographic Characteristics	8
Socioeconomic Development	9
3. Kerala State: Demographic and Family Planning Background	18
Population Trends	18
Family Planning Program	24
Part Two. Major Findings	36
4. Fertility Trends	39
Fertility Rates	40
Fertility Differentials by Socioeconomic Group	51
Fertility Differentials by Family Planning Status	58
Factors Related to Fertility: Regression Analyses	61
5. Desire for Children	67
Desired Number of Children	68
Desire for Another Child	84
Unmet Demand for Family Planning	90
6. Marriage as a Factor in the Fertility Trend	94
Marital Status Distribution	94
Age at Marriage: Trends and Differentials	96
Factors Related to Age at Marriage: Regression Analyses	99
The Marriage Factor and the Fertility Decline	101

Page

7. Family Planning as a Factor in the Fertility Trend 105

Knowledge of Family Planning Methods 106
Practice of Family Planning 108
Factors Related to Family Planning: Regression Analyses . . 116
Reasons for Not Using a Contraceptive. 121
Family Planning Use and the Fertility Decline. 121

Part Three. Interpretations and Conclusions 124

8. Determinants of Age at Marriage 127

Conceptual Framework 127
Empirical Evidence 128

9. Determinants of Fertility Decline. 139

Conceptual Framework 139
Empirical Evidence 146

10. The Kerala Experience: Policy and Research Implications . . 175

Annex Tables 180

Bibliography 193

Publications Based on the Research on Determinants of Fertility in Sri Lanka and South India 196

Map of Kerala. 198

List of Figures

		Page
Figure 3.1	Family Welfare Program, organizational chart.....	28
Figure 4.1	Fertility patterns in Kerala and selected Asian countries	46
Figure 4.2	Period-specific fertility rates, three districts of Kerala, 1965-70, 1970-75, and 1975-80	48
Figure 4.3	Cumulative cohort (birth) fertility rates, 1930-35 to 1960-65	50
Figure 5.1	Percent distribution of women by desired number of children and children ever-born, for the three districts, Kerala.....	74
Figure 5.2	Distribution of women by difference between parity and desired number of children by parity, Kerala.....	78
Figure 6.1	Specific fertility rates, 1965-70 and 1975-80, and fertility decline due to marriage and fertility factors, Kerala.....	104
Figure 7.1	Partial regression between years of schooling and birth control practice, Kerala, 1980.....	119
Figure 7.2	Potential fertility reduction due to celibacy, sterilization, and family planning use, Kerala, 1980.....	123
Figure 8.1	Impact of social reforms on fertility in Kerala.....	125
Figure 8.2	Determinants of age at marriage	129
Figure 9.1	Impact of land reforms, agrarian, and other reforms on fertility trends in Kerala	144
Figure 9.2	Recursive model of the relationship between education and fertility, Kerala	156
Figure 9.3	Birth interval following an infant death by duration of survival (months), Kerala	159
Figure 9.4	Sterilization and family planning practice by age, Kerala and Sri Lanka	171
Figure 9.5	Sterilization and family planning practice by education, Kerala and Sri Lanka	172

List of Tables

		Page
Table 2.1	Health facilities in Kerala and India, 1979/80	12
Table 2.2	Percentage literate in Kerala and India, 1901-81	12
Table 2.3	Educational facilities in Kerala and India, 1979/80.....	14
Table 3.1	Population growth in Kerala and India, 1901-81.....	18
Table 3.2	Distribution of villages by population size, Kerala and India, 1971.....	19
Table 3.3	Crude birth rate in Kerala and India, 1931-81.....	21
Table 3.4	Age-specific and total fertility rates in Kerala, 1958, 1971, and 1976	22
Table 3.5	Crude death rate in Kerala and India, 1931-81	23
Table 3.6	Infant mortality rate in Kerala and India, 1951-79.....	23
Table 3.7	Rates of incentive payments, 1966-67	29
Table 3.8	Rates of incentive payments, 1977	30
Table 3.9	Achievement record of family planning methods, Kerala, 1957-80	33
Table 3.10	Mid-year population, births averted, and crude birth rate, Kerala 1961-80	34
Table 3.11	Number of MTP acceptors in Kerala, 1972-80.....	35
Table 4.1	Households and respondents surveyed	37
Table 4.2	Percentage of population in the younger age groups by district, Kerala, 1980.....	40
Table 4.3	Crude birth rate by district, Kerala, 1965-80	41
Table 4.4	Comparison of survey and SRS birth rates, 1975-80.....	42
Table 4.5	Crude birth rate, Kerala and selected economies in Asia, 1975-80.....	42
Table 4.6	Average number of children ever-born by age of woman and district, Kerala	43

List of Tables (cont.)

		Page
Table 4.7	Average number of children ever-born by duration of marriage and district, Kerala	44
Table 4.8	Age-specific and total fertility rates three districts combined, Kerala.....	45
Table 4.9	Average number of children ever-born by duration of and age at marriage, three districts combined, Kerala	51
Table 4.10	Average number of children ever-born by duration of marriage and education of mother, three districts combined, Kerala	52
Table 4.11	Marital fertility rates by education, three districts combined, Kerala	53
Table 4.12	Average number of children ever-born by duration of marriage and caste, three districts combined, Kerala ...	55
Table 4.13	Average number of children ever-born by duration of marriage and per capita household expenditures, three districts combined, Kerala	56
Table 4.14	Average number of children ever-born by duration of marriage and land owned, three districts combined, Kerala	57
Table 4.15	Marital fertility rates by age and family planning status, three districts combined, Kerala	59
Table 4.16	Marital fertility rates by age and sterilization status, three districts combined, Kerala	60
Table 4.17	Marital fertility rates by sterilization status, broad age groups, three districts combined, Kerala	61
Table 4.18	Summary of regression analyses of fertility measures	63
Table 5.1	Distribution of women by desired number of children, three districts combined, Kerala	69
Table 5.2	Average desired number of children by number of children ever-born (parity), Kerala	70
Table 5.3	Average desired number of children by age of woman, Kerala	71

List of Tables (cont.)

		Page
Table 5.4	Average desired number of children by selected characteristics of woman, three districts combined, Kerala	72
Table 5.5	Percentage of women by fertility status and district, Kerala	75
Table 5.6	Distribution of women by gross and net fertility status, three districts combined, Kerala	76
Table 5.7	Distrubution of women by number of undesired children, three districts combined, Kerala	76
Table 5.8	Percentage of excess fertility women by socioeconomic group, three districts combined, Kerala	79
Table 5.9	Distribution of undesired children by parity of mother, three districts combined, Kerala	80
Table 5.10	Distribution of women by fertility status and family planning use, three districts combined, Kerala	82
Table 5.11	Percentage of women using family planning by education and fertility status, three districts combined, Kerala	83
Table 5.12	Characteristics of currently married women by desire for another child, three districts combined, Kerala.....	85
Table 5.13	Summary of regression of desire for another child	87
Table 5.14	Family planning use by desire for another child, three districts combined, Kerala, ...	87
Table 5.15	Characteristics of currently married women by contraceptive practice and desire for another child, three districts combined, Kerala	88
Table 5.16	Summary of regression of use of contraception for women who do not want another child	89
Table 5.17	Summary of regression of use of contraception for women who want another child	89
Table 5.18	Percentage of women with an unmet demand for family planning, three districts combined, Kerala	91

List of Tables (Cont.)

		Page
Table 5.19	Characteristics of women who do not want another child but are not using contraception, three districts combined, Kerala	92
Table 5.20	Reasons for not using contraception given by women who do not want another child, three districts combined, Kerala	93
Table 6.1	Distribution of women aged 15-49 by marital status, 1971 and 1980, Kerala	95
Table 6.2	Percentage of ever-married women By marital status, 1971 and 1980, Kerala	95
Table 6.3	Percentage of women never married and currently married By age, 1971 and 1980, Kerala	96
Table 6.4	Median age at marriage by district, 1961, 1971, and 1980, Kerala	97
Table 6.5	Mean age at marriage by marriage date and district, Kerala	97
Table 6.6	Average age at marriage of women by age, three districts combined, Kerala	98
Table 6.7	Average age at marriage of women by education, three districts combined, Kerala	98
Table 6.8	Average age at marriage of women by caste, three districts combined, Kerala	99
Table 6.9	Summary of regression analyses of age at marriage	100
Table 6.10	Percentage of women married by age, three districts combined, Kerala	102
Table 6.11	Marital fertility rates by age, three districts combined, Kerala	102
Table 7.1	Knowledge of family planning methods by selected characteristics of woman, three districts combined, Kerala	107
Table 7.2	Percentage of ever-married women currently using conventional family planning methods by district, Kerala	109

List of Tables (cont.)

Page

Table 7.3 Percentage of women using conventional family planning methods by age, three districts combined, Kerala 110

Table 7.4 Percentage of women using conventional family planning methods by parity, three districts combined, Kerala 110

Table 7.5 Percentage of women using conventional family planning methods by education, three districts combined, Kerala 111

Table 7.6 Percentage of women using conventional family planning methods by household expenditures, three districts combined, Kerala 111

Table 7.7 Percentage of women using conventional family planning methods by caste, three districts combined, Kerala 112

Table 7.8 Percentage of exposed women sterilized, selected countries 112

Table 7.9 Percentage of ever-married women sterilized by district, Kerala 113

Table 7.10 Percentage of women sterilized by age, three districts combined, Kerala 114

Table 7.11 Percentage of women sterilized by parity, three districts combined, Kerala 114

Table 7.12 Percentage of ever-married women by family planning method and education, three districts combined, Kerala 115

Table 7.13 Summary of regression analyses of family planning use 117

Table 7.14 Reasons for not using contraception, three districts combined, Kerala 121

Table 8.1 Who made decision about first marriage, three districts combined, Kerala 130

Table 8.2 Who made marriage decision by education of the bride, three districts combined, Kerala 131

List of Tables (Cont.)

		Page
Table 8.3	Reasons for not marrying earlier than intended, never-married women, three districts combined, Kerala	131
Table 8.4	Regression between education of woman and age at marriage	132
Table 8.5	Opinion of married and unmarried women about marrying a boy without a job, three districts combined, Kerala	133
Table 8.6	Dowry of married women by education, three districts combined, Kerala	134
Table 8.7	Regression between dowry (actual or expected) and age at marriage	135
Table 8.8	Proportion of ever-married women by education whose marriage was delayed due to dowry problems, three districts combined, Kerala	135
Table 8.9	Proportion of married women by place of residence during first year of marriage and education, and of never-married women by opinion about place of residence after marriage, three districts combined, Kerala	136
Table 8.10	Distribution of women by marital status and opinion about postponement of marriage if separate housing not available, three districts combined, Kerala	136
Table 8.11	Distribution of women by actual or intended compared to best age at marriage, three districts combined, Kerala	138
Table 9.1	Expectations about education of boys and girls by age of mother and education of parents, three districts combined, Kerala	147
Table 9.2	Percentage of ever-married women by minimum education thought necessary for boys and girls, three districts combined, Kerala	147
Table 9.3	Reasons given for children's possible nonachievement of desired education, three districts combined, Kerala	148

List of Tables (cont.)

		Page
Table 9.4	Children's help around the house, three districts combined, Kerala	149
Table 9.5	Children twelve years and over who work and contribute earnings to household, three districts combined, Kerala	149
Table 9.6	Expectations of future economic help from children, three districts combined, Kerala	150
Table 9.7	Expectations of old age financial support from children, three districts combined, Kerala	151
Table 9.8	Desired family size by age at marriage and education, three districts combined, Kerala	152
Table 9.9	Knowledge and practice of family planning by education, three districts combined, Kerala	153
Table 9.10	Percentage of women who are sterilized or use a conventional family planning method by education and fertility status, three districts combined, Kerala	153
Table 9.11	Fertility rates by education, three districts combined, Kerala	154
Table 9.12	Partial regression coefficients of selected fertility-related variables on years of schooling	155
Table 9.13	Birth rates and death rates in Kerala by region, various years, 1956-75	157
Table 9.14	Average birth interval in months classified by mortality experience of initial birth, three districts combined, Kerala	158
Table 9.15	Partial regression coefficients of birth interval on mortality status of initial birth and socioeconomic and demographic variables	160
Table 9.16	Average birth interval following a twin birth, three districts combined, Kerala	160
Table 9.17	Distribution of land transfers due to land reform, three districts combined, Kerala	162

List of Tables (cont.)

	Page
Table 9.18 Fertility measures by ownership of land, three districts combined, Kerala	163
Table 9.19 Standardized regression coefficients between landownership and fertility measures	163
Table 9.20 General fertility rates of women classified by type of land transfer during 1970-80, three districts combined, Kerala	164
Table 9.21 Standardized regression coefficients between land transfers and fertility-related (intermediate) variables	166
Table 9.22 Marital fertility and births averted by district and time period, 1965-79	169
Table 9.23 Estimate of excess sterilization rate in Kerala	173

List of Annex Tables

		Page
Table 1	Population, density, and growth rate by district	180
Table 2	Expenditures on Family Welfare Program, Kerala, 1952-80	181
Table 3	Number of births averted due to use of family planning methods, Kerala, 1957-80	182
Table 4	Age-specific marital fertility rates	183
Table 5	Age- and period-specific fertility rates 1945-80	183
Table 6	Distribution of married women by age at marriage and education, and standardized fertility rates	184
Table 7	Marital fertility rate by age and education	185
Table 8	Marital fertility rate by caste	186
Table 9	Percent decline in fertility rate by household expenditures	186
Table 10	Marital fertility rate by household expenditures	187
Table 11	Marital fertility rate by ownership of land	187
Table 12	Percentage of nonusers of family planning by fertility status, age, and parity	188
Table 13	Analysis of fertility change due to the marriage factor	189
Table 14	Percentage of women using family planning methods by age at marriage	190
Table 15	Percentage of women using family planning methods by household expenditures	190
Table 16	Percentage of women using family planning methods by landownership	191
Table 17	Percentage of women using family planning methods by age	191

List of Annex Tables (cont.)

		Page
Table 18	Percentage of women using family planning methods by parity	192
Table 19	Percentage of women using family planning methods by caste	192

Preface

This study of the determinants of fertility decline in Kerala is part of a larger research project sponsored by the World Bank entitled "Case Studies of the Determinants of Fertility Decline in Sri Lanka and South India" (RPO 671-70). Three household surveys were conducted to gather data for the analysis: in Kerala, Karnataka, and Sri Lanka. The Karnataka study was carried out by the Institute for Social and Economic Change, Bangalore, and the Sri Lanka Study by the Department of Census and Statistics, Colombo. All three studies have the same objective: an understanding of the determinants of fertility decline in a low-income population. While the socioeconomic and family planning factors differ slightly from one population to the next, the studies are complementary in the sense that a comparison of their findings enriches the understanding of the fertility decline in each separate population. Other reports and articles based on this research project are listed following the biblography.

The Kerala study was organized as a collaborative research effort between the World Bank and the Kerala State Bureau of Economics and Statistics (the Bureau). The objectives of the project were defined by the Bank; the survey instruments were prepared jointly by the Bank and the Bureau; and the field work was organized and carried out by the Bureau with the help of its staff and a team of field investigators recruited especially for the purpose. The cost of the study was met mostly by funds provided by the Bank and the United Nations Fund for Population Activities, but the Bureau shared the expenses by providing vehicles, offices, and other logistic services.

On behalf of the Bank and as the principal researcher of the project, I wish to acknowledge my thanks to the governments and organizations which helped carry out this project -- to the UNFPA for providing partial financial support; to the Governments of India and Sri Lanka for collaborating with the Bank on the project; and to the Bureau of Economics and Statistics in Trivandrum.

In preparing this report, I have received the advice and support of a number of persons. Dr. P.A. Nair, Director, Bureau of Economics and Statistics, Trivandrum, provided very valuable assistance in carrying out the survey and getting the data processed. Dr. R.S. Kurup, Additional Director of the Bureau, was a major source of help at all stages of the study. He also contributed to the report by preparing a background paper on the determinants of age at marriage (Chapter 8). Mr. P.S. Gopinathan Nair, as officer-in-charge of the project, was largely responsible for the high quality of the survey data. He also helped in the report writing by preparing background papers (for Chapters 2 and 3). Three other people in the Bureau of Economics and Statistics deserve special mention: Messrs. Somasekaran Nair, P. Gopinathan Nair, and E.G. John.

Professor Krishnan Namboodiri, Dr. T.N. Krishnan, and Mr. V.C. Chidambaram were associated with the project from its beginning. Professor Namboodiri helped in preparing the project proposal; Dr. Krishnan played a significant role in reviewing the conceptual framework of the determinants of fertility decline in Kerala; and Mr. Chidambaram provided expert advice from the World Fertility Survey experience.

The report benefited considerably from comments received from several staff members within the World Bank: Jeremy Warford, Timothy King, Susan Cochrane, Nancy Birdsall, Dr. Kandiah Kanagaratnam, Roberto Cuca, Huw Jones, Nydia Maraviglia, and Rashid Faruquee.

The data required for the report were processed partly at the Bureau (Trivandrum), and partly at the Bank. This work as well as the statistical analysis were ably carried out by Mr. Kalyanaraman at Trivandrum, and by Sulekha Patel, My Vu, and Ann Elwan at the Bank, with occasional assistance from Kalpana Mehra. I am very appreciative of their substantial contributions from the beginning of the project.

The arduous task of putting together the draft chapters written over a period of three years fell on Bonnie Newlon. I am very thankful for all her assistance in making this a consistent report. Jeanne Rosen edited the final manuscript for publication, retaining our findings in a form both pleasant and enlightening. While this project has benefited from the work of many, I am -- needless to add -- responsible for the errors.

K. C. Zachariah
The World Bank

Summary and Conclusions

The principal objective of this study was an analysis of the determinants of the fertility decline which took place in Kerala in recent years under seemingly unfavorable circumstances. The study used data collected from 3,000 households selected at random from three districts of the state -- Alleppey, Ernakulum, and Phalghat. The analysis aimed at estimating fertility trends by socioeconomic groups and developing a socio-economic framework to explain these trends.

The results of the survey indicated that the fertility decline in Kerala was as sharp as indicated by official figures. The decline was not confined to any particular socioeconomic group but was evident among all socioeconomic as well as cultural groups. It was greatest among those women whose years of schooling and family income were in the intermediate range rather than at either extreme.

About 30 percent of the overall fertility decline between 1965 and 1980 can be attributed to an increase in age at marriage. The impact of this factor has been on the increase in recent years. The socioeconomic determinants of age at marriage were similar to those for fertility. The more years of schooling a woman had, or the better off she was economically, the more likely she was to marry at an older age. Caste and religion also made a difference. Employment of the prospective husband is emerging as a pre-requisite to marriage; most women would rather wait than marry someone who is unemployed. Dowry problems also cause delays, as the price goes up in response to the increased cost of educating a boy and his increased difficulties in securing job.

About 70 percent of the fertility decline during this period represented a decline in marital fertility. Kerala has one of the most successful family planning programs in India. While there are some methodological difficulties in measuring the impact of a family planning program on marital fertility, this study provides considerable evidence that recent official family planning efforts have made a major dent in Kerala's fertility rate. Almost all women know about some form of birth control. About 52 percent of the currently married women surveyed were themselves sterilized, had a sterilized husband, or were using a conventional family planning method. About 31 percent relied on sterilization; indeed, sterilization alone may well account for much of the ferility decline not due to increase in age at marriage. Socioeconomic variables have some significant correlation to family planning, but they nevertheless explain only a small percentage of the total variation in knowledge and use. The nature and services of the family planning program itself seem to be of greater importance in determining whether a particular couple does or does not adopt some form of family planning.

Irrespective of the means by which fertility was controlled, the underlying factors were a series of socioeconomic changes. But these changes alone would not have produced the type of fertility decline that occurred in Kerala. The official family planning program played a crucial role in helping to convert the lower desired family size into a reduced number of children.

Educational developments and improvements in health successfully altered the cost-benefit ratio of children. Falling mortality rates increased the number of children surviving to school age. Rapid population growth, resulting mostly from the mortality decline, lowered further an already very low land-man ratio in the State, forcing more and more youngsters to seek a living away from the farms. The introduction of education as a criterion for admittance to non-agricultural occupations enhanced the economic value of education and raised parents' aspirations about their children's education. The increase in the number of surviving children, together with the increase in the perceived necessary level of education, raised the cost of bringing up children. As most Kerala families did not have the necessary income to meet this increased cost, they realized that the solution to their dilemma was to opt for a smaller family.

The increase in the cost of bringing up children has been accompanied by a decrease in the cost of fertility control. Before 1960 family planning services were not widely available in Kerala. When the official family planning services were introduced, they were not only free, but actually included some economic incentives for the acceptors. The official family planning program provided a needed service and acted as an independent causal factor in the fertility decline.

Nevertheless, for a significant proportion of married couples, new attitudes toward family size were not strong enough to spur them to visit a family planning clinic and avail themselves of its services. A rough estimate shows that about 13 percent of married women in Kerala who do not want any more children are not taking any steps to protect themselves from unwanted pregnancy. It is among women with an unmet need for family planning that the official program can and does play a major role. Without such a program, the number of women in Kerala with more children than they wanted would have been several times greater, and the fertility decline would have been 36 percent less.

Has Kerala's experience any relevance to other populations? To the extent that historical developments were as critical a factor as recent policy interventions in bringing down the birth rate, the experience is not entirely replicable elsewhere. At the same time, there are certain lessons to be learned from an analysis of the determinants of Kerala's fertility decline that are broadly applicable.

First, a government-sponsored family planning program can make a substantial dent in fertility rates (decreasing them by about 40 percent in Kerala during 1968-78), not only among the higher socioeconomic strata, but even more so among the lower strata. Within limits, the normal positive association between socioeconomic status and family planning acceptance can be broken by a good family planning delivery system aided by economic incentives. Without a very strong program, however, it may be difficult to produce an acceptance rate among the poor as high as or close to that of the rich.

Second, the principal socioeconomic determinants of fertility decline in Kerala, as in many other populations, have been mortality decline and educational improvement. It is unlikely that the major demand-creating factors in other populations would be much different. Thus, health and education are the principal variables to be manipulated to create additional demand for fertility control.

Third, the official family planning program has been more effective in Kerala than in the other States of India. One major reason is the higher spin-off effect between the program and socioeconomic developments relevant to fertility decline (health and education in particular). One lesson from this is that the sequence in which policies affecting the determinants of fertility are implemented is as important as the policies themselves. In Kerala, the steps came in the right order -- a reduction in infant and child mortality, accompanied or followed by an increase in female education, followed by redistributive policies and finally by the official family planning program. The impact of Kerala's family planning program would have been much smaller and more temporary had the program been introduced prior to a substantial reduction in the infant mortality rate and a substantial improvement in female education. In populations where the infant mortality rate is still high and where female literacy is still low, the impact of a similar family planning program would be much more limited. In such populations, improvements in health and education should be accelerated, not only for their own sake, but also as an essential part of a family planning effort.

Fourth, in spite of a very successful family planning program, about 13 percent of the married women of Kerala who do not want any more children are not sterilized themselves, nor have a sterilized husband, nor are using a contraceptive. One possible reason for such a large unmet demand is dislike of the type of family planning methods, especially the terminal methods, offered by the program. These women could be brought into the program if acceptable, reversible methods were offered.

Fifth, land reforms and other redistributive policies help to spread small family norms. While their short-term effect on fertility may not be great, such reforms have a significant role to play in a long-term strategy to reduce fertility.

Sixth, an increase in age at marriage played a major role in Kerala's fertility decline. The potential for fertility decline in the other States of India through increased age at marriage is very great. This is a means of fertility reduction which is largely untapped in most of India.

Chapter 1. Introduction

It is widely believed that during the past 15 to 20 years the birth rate in Kerala in southwest India has fallen very sharply, despite seemingly unfavorable conditions. This situation is contrary to what would be expected from circumstances elsewhere in the world. Such a rapid fertility decline is an anomaly, given the level of poverty and the relative lack of economic progress in the region. The present study, based on a field investigation in three districts of Kerala State, seeks to account for this anomaly by analyzing the determinants of the fertility decline that has occurred in recent years, and to understand the implications of the Kerala experience for future policymaking.

The Anomaly

Official estimates of the fertility level and trends in Kerala are based on evidence that is varied and mutually supportive. The Sample Registration System (SRS) indicates that between 1966 and 1978 the birth rate in rural Kerala declined from 37 to 26 per thousand population (Government of India, Vital Statistics Division, 1966-78). The 1981 census of India records that the State's population increase fell from 26 percent in 1961-71 to 19 percent in 1971-81, a drop of 0.6 in the annual percentage growth rate (Government of India, Registrar General and Census Commissioner, 1981, Series-1, Paper 1, p. 53). The number of students in Standard I increased by 2.7 percent a year between 1960/61 and 1970/71, but decreased by 2.2 percent a year between 1970/71 and 1979/80 (Government of Kerala, Directorate of Economics and Statistics, 1980, p. 252). Between 1964 and 1976, more than a million married individuals were sterilized and about 1.4 million births were averted by the official family planning program (Government of Kerala 1978, Table 13).

Fertility declines of such magnitude as those reported for Kerala are not unprecedented in other societies. In fact, more rapid fertility declines have been observed in recent years in other Asian populations; Singapore, Hong Kong, the Republic of Korea, and Taiwan, China are well-known examples. Falling fertility rates in these cases have been associated with high average per capita income, rapid economic growth, a large proportion of the labor force in nonagricultural occupations, high female literacy and employment, high nutritional levels, low mortality, high national expenditures for family planning programs, and other indications of social and economic change.

The conditions in Kerala, however, do not conform to this socioeconomic development pattern, and would not seem to favor a rapid fertility decline. As one of the poorer States of India, with a per capita income less than that of India as a whole, Kerala compares very unfavorably with the Asian economies mentioned above. Per capita income is less than US$200, compared with over $5,240 in Singapore, $5,100 in Hong Kong, and $1,700 in Korea. Moreover, in 1971 about 55 percent of the labor force in Kerala was employed in the agricultural sector compared with 2 percent in Singapore, 3 percent in Hong Kong, and 41 percent in Korea.

Regarding nutrition, the rank of Kerala among the Indian States is uncertain. According to the Indian National Sample Survey (NSS), the per capita calorie consumption in Kerala was only 1,571 in 1973-74, or 70 percent of the average daily requirement. This is two-thirds of the daily per capita consumption in India, 50 percent that of Singapore, 53 percent that of Hong Kong, and 55 percent that of Taiwan, China, and of Korea (see Panikar 1980; World Bank 1980, Table 22).

Female literacy and total average life expectancy in Kerala compare very favorably with other parts of India. Female literacy in 1981 was 66 percent in Kerala as opposed to 25 percent in India; life expectancy in 1978 was 65 years in Kerala but only 54 years in India. The East Asian "success" economies and Kerala are fairly similar in average female literacy and total life expectancy.[1/]

Kerala spends comparatively less per capita on family planning than the "success" economies, however; in 1978 the expenditure was less than 9 US cents (Government of Kerala 1978, Appendix E, Table 1). Singapore, by comparison, spent 30 cents; Hong Kong, 10 cents; Taiwan, China, 11 cents; Korea, 16 cents; and Malaysia, 20 cents (Nortman and Hofstatter 1978, Table 9).

Thus, many conditions in Kerala are different from those in other populations that have experienced rapid declines in fertility. If high per capita income and rapid economic growth are necessary conditions for curbing fertility, then Kerala's fertility would not have declined so sharply. Nor would it have done so if urbanization and rapid industrialization are essential prerequisites, or if a high level of nutritional intake is crucial. Kerala does not conform to the stereotype of the East Asian "success" economies, yet fertility has indeed fallen. This is the anomaly of the fertility decline in Kerala, the investigation of which is the objective of this study.

What are the causes of Kerala's fertility decline? The question is put very lucidly by John Ratcliffe in a 1978 article in the International Journal of Health Services:

> How did such a large population with levels of income and nutrition among the lowest in the world achieve levels of fertility and mortality substantially lower than surrounding populations with similar cultural backgrounds but higher incomes and caloric intakes? The answer to this question holds profound implications for all nations concerned with population, health, and social and economic development. (p. 124)

1/ Life expectancy at birth in 1978 was 63 in Korea, 72 in Taiwan, China and in Hong Kong, and 70 in Singapore (World Bank 1980, Table 21). Female literacy among those six years old and over reached 84 percent in Korea in 1970, 63 percent in Hong Kong in 1971, 81 percent in Taiwan, China in 1975, and 67 percent in Singapore in 1976 (Nortman and Hofstatter 1978, Table 3).

Conclusions from the Study

The demographic data available for Kerala are barely sufficient to describe the recent fertility trend in the State as a whole; they are not at all sufficient to answer the key question posed above. In order to make possible an in-depth analysis of the characteristics of the fertility decline and its determinants, the research project included the collection of relevant data through a sample survey. As the main objective was a determination of the causes of the fertility decline (and not an estimation of the fertility level for the State as a whole), it was thought unnecessary to cover the entire State. Three districts were selected for field investigation, one from each of the three administrative divisions which form the present Kerala State: Palghat District, Ernakulam District, and Alleppey District (see map). The choice was made not at random, but on the basis of geographic location, fertility level, and certain field problems associated with carrying out detailed interviews on family planning and related matters.

The household was the ultimate sampling unit. From each of the three districts, a sample of about 1,000 households was selected. The 300-odd questions used in the interviews provided a detailed picture of the demographic and socioeconomic characteristics of each household and of the adult members living in it. Information was collected on children born, family planning knowledge and use, age at marriage, and attitudes toward marriage. The socioeconomic variables surveyed included housing, education, religion, caste, occupation, and income of both men and women.

The results of the survey confirmed that the official estimates of fertility level and trend were quite accurate, and that the fertility decline in Kerala State was indeed sharp in recent years not only among the rich and well educated, but also among the poor and illiterate sectors of the population. Furthermore, an analysis of the data reveals that an increase in both age at marriage and family planning practice contributed to this decline.

While it is true that women in all the major socioeconomic groups in the survey districts have been giving birth to fewer children, the fertility decline was greatest among those women whose years of schooling and family income were in the intermediate range rather than at either extreme. Socioeconomic variables did show certain significant correlations with fertility during the period covered by this study. At the same time, differences related to such factors have tended to narrow in recent years.

About 30 percent of the overall fertility decline between 1965 and 1980 can be attributed to an increase in the age at which women married and a corresponding decrease in the proportion of women married. The impact of this factor has been increasing in recent years. The socioeconomic determinants of age at marriage were similar to those for fertility. The more years of schooling a woman had, or the better off she was economically, the more likely she was to marry at an older age. Caste and religion also made a difference. In addition, several other considerations, perhaps less relevant in the past, contributed to delaying marriages. Employment of the

prospective husband is emerging as a prerequisite to marriage; most women would rather wait than marry someone who is unemployed. Dowry problems can also cause delays, as the price goes up in response to the increased costs of educating a boy and his increased difficulties in securing a job.

The remainder of the fertility decline during this period represented a decline in marital fertility. Kerala is considered to have one of the most successful family planning programs in India. While there are some methodological difficulties in measuring the impact of a family planning program on marital fertility, this study provides considerable evidence that recent official family planning efforts have made some dent in Kerala's fertility rate. Almost all women know something about birth control methods. About 52 percent of the currently married women surveyed were themselves sterilized, had a sterilized husband, or were using a conventional family planning method. Sterilization alone may well account for much of the fertility decline not due to an increase in age at marriage; the impact of conventional contraceptive use on fertility turns out to be minimal. Socioeconomic variables have some significant correlation to family planning practices, but they nevertheless explain only a small percentage of the total variation in knowledge and use. The nature and services of the family planning program itself seem to be of greater importance in determining whether a particular couple does or does not adopt some form of family planning.

Irrespective of the means by which fertility was controlled, whether by delayed marriage or through family planning practice among the married, the underlying factors accounting for the decline were a series of socioeconomic changes which altered the cost-benefit ratio of children and consequently the accepted norms about family size. But these changes alone would not have produced the type of fertility decline that occurred in Kerala. The official family planning program played a crucial role in helping to convert the lower desired family size into a reduced number of children.

The socioeconomic changes which successfully altered the cost-benefit ratio of children were primarily improvements in health and education over a long period of time. Falling mortality rates increased the number of children surviving to school age. Rapid population growth, resulting mostly from the mortality decline, lowered further an already very low land-man ratio in the State, forcing more and more youngsters to seek a living away from the farms. The introduction of education as a criterion for admittance to nonagricultural occupations enhanced the economic value of education and raised parents' aspirations about their children's education. In the caste-ridden Kerala society, education offers the best chance for upward social mobility. The increase in the number of surviving children, together with the increase in the perceived necessary level of education, raised the cost of bringing up children. As most Kerala families did not have enough income to meet this increased cost, they realized that the solution to their dilemma was to opt for a smaller family.

The increase in the cost of bringing up children has been accompanied by a decrease in the cost of fertility control. Before 1960 family planning services were not widely available in Kerala. When the

official family planning services were introduced, they were not only free, but actually included some economic incentives for the acceptors. The official family planning program provided a needed service and acted as an independent causal factor in the fertility decline.

Nevertheless, for a large proportion of married couples, new attitudes toward family size were not strong enough to spur them to visit a family planning clinic and avail themselves of its services. A rough estimate shows that about 18 percent of all married women in Kerala who had as many children as they wanted, or more than they wanted, did not take any steps to protect themselves from unwanted pregnancy. It is among such women -- with their unmet demand for family planning -- that the official program can and does play a major role. Without such a program, the number of women in Kerala with more children than they desire would have been several times greater, and the fertility decline would have been 36 percent less.

The Kerala experience has demonstrated the feasibility of bringing about a substantial fertility decline even among the poor and the illiterate through an efficient family planning program. This does not signify, however, that a fertility decline can be sustained over a long period if there is no demand for family planning services. In Kerala there was considerable if latent demand, created by a low level of infant mortality and a high level of female education. Therefore, Kerala's family planning program has been much more successful than similar programs in the other States of India.

Yet, even with the success achieved in mortality reduction and educational improvement, the desired family size (and actual fertility) may not reach replacement level in Kerala. Generating additional demand for fertility control depends on introducing some system of old age security. At present, almost all Kerala couples expect to depend on their children in their old age. Unless alternate provisions are made, parents will have no other option and will therefore continue to desire a family sufficiently large to ensure at least one surviving son. Kerala can expect a period of stagnant fertility rates until such time as alternate social security arrangements are provided.

Policy Implications

Kerala's fertility decline has received worldwide attention, mainly because of the seemingly unfavorable circumstances in which it took place. Low per capita income and low levels of industrialization, urbanization, and nutrition do not generally go hand in hand with a rapid fall in fertility. Our analysis has shown, however, that a high degree of economic progress is not a necessary condition for reducing fertility; such a decline can indeed take place in low-income populations largely dependent on agriculture or other primary occupations. The Kerala study corroborates the "reappraisal" of theories of fertility decline made by Freedman (1979). Freedman postulates that fertility decline takes place in response to an increase in the cost of bringing up children relative to the benefits from them, combined with exposure to contraceptive knowledge and services.

An increase in the cost of bringing up children can come about in several ways; in Kerala it resulted from the increase in children surviving to school age and the need to educate these children to increasingly higher levels of attainment. Because of these changes, and because of an egalitarian distribution of government services, Kerala has witnessed a marked decline in fertility in recent years - without a high per capita income, or urbanization, or industrialization.

Has Kerala's experience any relevance to other States in India? The answer depends on whether the determinants of Kerala's fertility decline are generalizable. To the extent that historical developments were as critical a factor as recent policy interventions in bringing down the birth rate, the experience is not entirely replicable elsewhere. At the same time, there are certain lessons to be learned from an analysis of the determinants of Kerala's fertility decline that are broadly applicable. These can be useful in reorganizing the Indian family planning program and in working out a long-term strategy for ensuring a sustained fertility reduction in other States as well.

First, a government-sponsored family planning program can make a substantial dent in fertility rates (decreasing them by about 40 percent in Kerala during 1968-78), not only among the higher socioe-conomic strata, but even more so among the lower strata. Within limits, the normal positive association between socio-economic status and family planning acceptance can be broken by a good family planning delivery system aided by economic incentives. Without economic incentives, however, it may be difficult to produce an acceptance rate among the poor as high as or close to that of the rich.

Second, the principal socioeconomic determinants of fertility decline in Kerala, as in many other populations, have been mortality decline and educational improvement, both of which operate by altering the cost-benefit ratio of children. It is unlikely that the major demand-creating factors in the other States of India would be much different. Thus, health and education are the principal variables to be manipulated to create additional demand for fertility control.

Third, the official family planning program has been more effective in Kerala than in the other States of India. One major reason for this is the higher spin-off effect between the program and socioeconomic developments relevant to fertility decline (health and education in particular). One lesson from this is that the sequence in which policies affecting the determinants of fertility are implemented is as important as the policies themselves. In Kerala, the steps came in the right order--a reduction in infant and child mortality, accompanied or followed by an increase in female education, followed by redistributive policies and finally by the official family planning program. The impact of Kerala's family planning program would have been much smaller and more temporary had the program been introduced prior to a substantial reduction in the infant mortality rate and a substantial improvement in female education. In States where the infant mortality rate is still above 100 per thousand live births, and where female literacy is still below 25 percent, the impact of a similar family planning program would

be much more limited. In such States, improvements in health and education should be accelerated, not only for their own sake, but also as an essential part of a family planning effort.

Fourth, in spite of a very successful family planning program, about 13 percent of the married women of Kerala who do not want any more children are not sterilized themselves, nor have a sterilized husband, nor are using a contraceptive. One possible reason for such a large unmet demand is dislike of the type of family planning methods, especially the terminal methods, offered by the program. These women could be brought into the program if acceptable, reversible methods were offered. The extent of unmet demand is likely to be larger in the other States of India, and the solution may also be the same.

Fifth, land reforms and other redistributive policies help to spread small family norms. While their short-term effect on fertility may not be great, such reforms have a significant role to play in a long-term strategy to reduce fertility. Another equally important social reform is provision for old age economic security. In spite of Kerala's advances with respect to mortality decline, female education, land reforms, and soon, there is very little change in parents' dependence on their own children in their old age. This could be an obstacle in the way of further reducing the desired family size. A long-term strategy to achieve replacement level fertility, whether in Kerala or in any other State in India, cannot ignore the need to develop old age social security programs.

Sixth, an increase in age at marriage played a major role in Kerala's fertility decline. The potential for fertility decline in the other States of India through increased age at marriage is very great. This is a means of fertility reduction which is largely untapped in most of India.

Part One. Background

Chapter 2. Kerala State: Geographic and Socioeconomic Background

The fertility level and trends of a population are closely related to its physical environment and socioeconomic milieu. This chapter, therefore, attempts to give a brief description of the physical characteristics of Kerala State and of its principal socioeconomic developments, especially those relevant to a study of the determinants of fertility.

Geographic Characteristics

Kerala is a relatively small State in the southwest corner of the Indian subcontinent. It was formed in 1956 out of three separate administrative units: Travancore State in the south, Cochin State in the middle, and the Malabar region of the Madras Province in the north. Travancore and Cochin were ruled by local maharajas, while Malabar was part of British India. Tranvancore and Cochin together account for about 60 percent of the population of Kerala and 55 percent of its area. Trivandrum at the southern end of the State is the political capital of Kerala; it used to be the capital of Travancore State.

Kerala State is a narrow strip of land extending from Kasaragod in the north to Trivandrum in the south (about 585 kilometers) and from the Western Ghats in the east to the Arabian Sea on the west (about 120 kilometers at the widest point). Some forty rivers flow from the Ghats to the sea, and a chain of backwaters connected by man-made canals runs parallel to the sea. The layout of the Ghats, the course of the rivers, and the location of the lagoons divide the State into three natural regions: lowland, midland, and highland. With an average rainfall of about 300 centimeters and an average temperature of 90°F (ranging from 70°F to 95°F), the land is fertile and perennially green. Paddy fields, coconut groves, banana gardens, tea and rubber estates, and tropical forests abound.

Although the land is fertile and water is plentiful, Kerala has been a food-deficit area since the turn of the century, if not earlier. There are two reasons for this. First, the man-land ratio is very small. The cultivable land per person is only 0.21 acres. Second, not all cultivable land is used for food production. More area could be brought under grain cultivation, but only at the expense of the more profitable commercial cultivation of coconuts, sugar cane, bananas, and other crops. As a result, Kerala is likely to remain a food-deficit State for years to come.

The heavy rain and the fast-flowing rivers provide ideal conditions for the production of hydroelectric power. Kerala is one of the few States in India where there is no power shortage. In fact, the State generates more hydroelectric power than it can currently consume, and the excess is sold to neighboring States. Almost all villages in Kerala are electrified, although the proportion of households with electricity is relatively small in most villages.

Kerala is noted for the cleanliness of its land and people. The abundance of fresh water is an important contributory factor. The annual floods brought by the southwest and northeast monsoons flush out the countryside every year, helping to keep both land and people healthy.

The State is endowed with good transportation networks--waterways, roadways, and railways. The rivers and lagoons are navigable and provide cheap inland water transport. The roadways (about 90,000 kilometers, or 2.3 kilometers per square kilometer of the State) connect most villages and towns and are the principal means of intrastate transport, while the railways (886 kilometers) are the principal means of interstate transport. The most popular mode of travel in the State is the government bus service, which is extensive and highly subsidized. In 1979/80 this system had a route length of 159,000 kilometers (4 kilometers per square kilometer of the State), operated 224 million kilometers (9 kilometers per inhabitant a year), and carried 706 million passengers (28 trips per inhabitant a year). 1/

One of the six international airports of India (Trivandrum) and two domestic airports are located in Kerala, as is the major seaport of Cochin. With the many transport facilities available, it is no wonder that Kerala's people are highly mobile, migrating to all parts of India and to many other countries as well.

Socioeconomic Development

In the theoretical framework adopted by this study (see Chapter 9), it is argued that the fertility decline that took place in Kerala in recent years was caused as much by historical developments as by recent policy interventions. Kerala's history prepared the ground whereby a fertility decline became possible and desirable for a majority of the people. Recent policy interventions then precipitated that decline.

From the very beginning of its history, Kerala has had extensive contacts with other cultures, both within and outside India. These contacts have played a significant part in the socioeconomic development of the State. From the other side of the Ghats came the caste and land tenure systems; from West Asia came Christianity, Islam, and Judaism; from Europe also came Christianity, as well as a modern administrative system, the plantation industry, modern education, public health, and so on.

The Aryans, arriving two or three centuries before the Christian era, introduced the caste system, a dominant socioeconomic and political force even today. The system used to be so rigid that people of lower castes could not come closer than a prescribed minimum distance (from 24-72 feet,

---

1/ The government-run service is the largest bus company in the State. There are, in addition, several privately owned local bus companies.

depending on the caste) when approaching those of higher castes (Menon 1979). 2/

European influence began with the arrival of the Portuguese in 1498. The Portuguese were followed by the Dutch (1602), the French (1644), and later the British. The political connection with Britain ended with Indian Independence in August 1947.

These foreign contacts have left some permanent marks on the population of Kerala. The State has a fairly balanced religious and caste composition that includes Nairs, Ezawas, Christians, and Muslims. As a result, no one group can profit at the expense of another. Rather than forming permanent alliances, the various groups shift their allegiances to suit their self-interests. The characteristic instability of the elected government and the give-and-take policies of each administration can be traced to a large extent to the balanced religious and caste composition of the population.

Historically, what most distinguished Kerala from the rest of India were its achievements in the fields of health and education. The modern formal educational system in the State owes its origin to the British rule in India and to the Christian missionaries who, finding a sizable Christian population in the State, concentrated their efforts on education and health instead of proselytizing. Fortunately, the indigenous tradition was favorable to education and the local rulers were supportive; by the end of the nineteenth century every village in Kerala had a primary school. 3/

The influence of Europeans on health was similar to that on education. They provided the initial impetus for development of a health care system, whereupon the indigenous tradition of scientific medicine and the wholehearted support of the maharajas carried the development forward. 4/

2/ One saving factor was that in case a lower-caste person came too close, the person who was polluted could cleanse himself with a simple bath. Because of this, many people in Kerala must have spent great amounts of time taking baths! Unintentionally, this caste rule and the resulting baths could have been one of the factors accounting for the low mortality found in Kerala.

3/ In 1817 the Maharani of Travancore announced that the State should defray the entire cost of the education of its people (Nag 1981, p. 32).

4/ "I take this opportunity earnestly to impress this fact on the minds of all my native subjects and to urge them to seek for themselves, for their children, for their friends and for their servants the great protection of vaccination. They will see the strength of my conviction in the fact that there is no member of my family who has not had this protection conferred at an early age." Speech by the Maharajah of Travancore in 1865 at the ceremonial opening of the Trivandrum Civil Hospital (Nagam Aiya 1906, pp. 524-25).

It is against this historical background that recent socioeconomic developments and policy interventions are best viewed. The remainder of this chapter describes very briefly developments in four areas of particular relevance to fertility -- health, education, political awareness, and land reform. The official family planning program is described in the next chapter, following a presentation of Kerala's demographic characteristics.

Health

The physical environment in most parts of Kerala is healthy and has always been so, except for the malarial tracts in the hills (malaria has now been eradicated). Kerala also has a long tradition of medical and health treatment (Ayurvedic system). The rulers of the State have always taken an interest in health matters and have committed sufficient public funds for both curative and preventive medicine. In addition, the foreign missionaries established private hospitals and trained health personnel.

Health conditions in Kerala have always been better than those in other parts of India, but recent developments have accentuated the disparity. The extent of this difference is indicated by the infant mortality rate, which in 1980 was about 45 per thousand live births in Kerala and 125 in India. The chance of an infant dying during the first twelve months of life in India today is about three times the corresponding chance in Kerala. The continued improvement in the health of the people has been tied to their educational attainments (as discussed below) and to health policies which have brought medical facilities within both their reach and their means.

The hospitals in Kerala are evenly distributed throughout the State. Statistics for 1979/80 indicate that the average service area of a Primary Health Center was 232 square kilometers in Kerala and 563 square kilometers in India; that of a subcenter was 21 square kilometers in Kerala and 63 square kilometers in India (Table 2.1). The number of hospital beds per 100,000 population was 458 in the urban areas of Kerala (263 in urban India) and 107 in the rural areas (12 in rural India). The easy access to medical facilities (due to the relatively small service area and good transport facilities), the relatively low cost of medical services, and the high demand for them (due to a more educated population) are all important reasons for the comparatively better health conditions in Kerala than in other States in India.

Education

The contrast between Kerala and India is equally striking with respect to educational attainment. In 1981 about 70 percent of the people in Kerala were literate compared with 36 percent in India (Table 2.2). Among females, the rates were 66 percent for Kerala and 25 percent for India. These differentials are not merely a carryover from historical differences, which were quite large. The improvement in literacy levels in the decade 1971-81 was greater in Kerala than in India (10.0 percentage points compared to 6.7).

Table 2.1 Health facilities in Kerala and India, 1979/80

Measure	Kerala	India
Hospital beds per 100,000 population		
Urban	458	263
Rural	107	12
Average service area per health center (square kilometers)		
Primary Health Center	232	563
Subcenters (either)	21	63
Health	79	108
Family Welfare	29	149
Persons per unit of health staff		
Doctor	2,385	2,674
Nurse	2,538	4,774
Midwife	3,068	4,947

Source: Government of India, Central Bureau of Health Intelligence, 1981, Pocket Book of Health Statistics of India 1980, Tables 2, 43, 50, 52, 53, and 56.

Table 2.2 Percentage literate in Kerala and India, 1901-81

Year	Kerala	India
1901	12.9	5.4
1911	15.5	5.9
1921	22.0	7.2
1931	25.0	9.5
1941	-	16.1
1951	47.4	16.7
1961	55.1	24.0
1971	60.4	29.5
1981	70.4	36.2

Source: Government of India, Registrar General and Census Commissioner, 1983, Census of India, 1981, Series-1, Paper 2 of 1983, Table 12. Figures for Kerala for years 1941-61 are from Census reports; for earlier years, from Government of Kerala, 1978, Report of the Committee for Evaluation of Family Welfare Programme (Kerala), Table 8, p. 187.

The development of education in the State owes much to the importance given it in the Kerala culture and to the work done by the European missionaries. Historically, education was provided using temples as centers, with nonformal lessons imparted to both men and women through puranic stories (Hindu epics) and devotional songs (Nag 1981, pp. 31-32). More recently the rulers of both Travancore and Cochin gave considerable impetus to education by having the State pay the entire cost of primary education. These official efforts were supplemented by private efforts which began with the foreign Christian missionaries' establishment of church-managed schools and colleges. The first Christian college (at Kottayam) was established in 1813.

The improvement in the literacy rate alone does not give a full picture of the educational "explosion" in Kerala since 1950. Data on the number of students at all levels, and on the number of schools and colleges of all types, are necessary to round out this picture.

Table 2.3 presents statistics on the formal channels of education, that is, the schools and colleges managed by the government, by private persons, or by organizations, and recognized by the appropriate government agencies (Kerala State Education Department or University). There are a large number of other educational institutions as well, including tutorial colleges and "parallel" colleges. The parallel colleges in Kerala are a unique institution. While the tutorial colleges take students who fail in public examinations, the parallel colleges take students who fail to gain admission to a recognized institution. Such students can study in parallel colleges and take the same examinations which students from recognized institutions take. If they pass, they get the same degree or diploma as the regular students. Thus, through the system of parallel colleges, a higher level of education, especially in liberal arts subjects, is made accessible to people from all walks of life.

Formal schools and colleges, as Table 2.3 indicates, are more easily accessible to people in Kerala than in India. Although the average population served by a school is greater, Kerala State spends a much higher proportion of its revenue for education than does India. Furthermore, the State spends proportionately more money on primary education than on higher levels of education compared to India.

Two aspects of these educational developments are particularly relevant to the fertility decline. First, education is so widespread that there are very few illiterate men or women in the prime childbearing ages. Second, the supply of educated personnel has been far in excess of demand, so that the problem of educated unemployment is becoming progressively worse.

Table 2.3 Educational facilities in Kerala and India, 1979/80

Measure		Kerala	India
Average population served by a school			
Lower Primary		3,440	1,400
Upper Primary		8,800	5,800
High School		14,300	14,500
College		130,000	200,000
Average area served by a school (square kilometers)			
Lower Primary		5.6	6.9 a/
Upper Primary		14.2	28.7 b/
High School		23.1	71.4
College		210.0	985.0
Per capita expenditure (Rs.)			
Primary Schools		116	83
Middle Schools		154	127
Enrollment ratio (enrolled/total age group)			
6-11 years	Boys	103.4	100.2
	Girls	102.2	65.9
	Total	102.8	83.6
11-14 years	Boys	91.8	52.0
	Girls	85.3	21.1
	Total	88.6	40.2

a. Primary School
b. Middle School

Source: Compiled from official government statistics.

Political Awareness

Every aspect of life in Kerala is politicized. Newspaper reading and political discussions are principal pastimes of the average person. Protest marches, general strikes, hunger strikes, and other public demonstrations are as much a daily occurrence in Kerala as the monsoon rain in July. For some people, participation in processions and protest meetings is a full-time job.

Such politicizing has many disruptive consequences, but it is not without beneficial effect. As Mencher writes:

> There is no question that politicisation of people in Kerala has played a major part in affecting people's health [for the better]...In Kerala, if a PHC [Primary Health Centre] was un-manned for a few days, there would be a massive demonstration at the nearest collectorate [a collector is the chief administrator of a district] led by local leftists, who would demand to be given what they knew they were entitled to. This has had the effect of making health care much more readily available for the poor in Kerala. (pp. 1781-82)

This is true not only for health services, but for all public services including education, rural bus service, postal service, food distribution, construction and maintenance of roads and bridges, and even contraceptive supplies and family planning services.5/ The political awareness and the politicization of all issues, even those affecting only a small minority of the population, may be responsible for better delivery of government services than would otherwise be the case. Newspapers and political leaders explain the services and benefits available, along with the eligibility requirements. And what people are eligible for, they obtain - by application, appeal, or agitation.

Land Reform and Other Redistribution Policies

Undoubtedly the most significant development in the recent political economy of the State is the shift in political power from the rich to the poor. Along with this shift, and as a consequence of it, there has been a considerable transfer of wealth and income to the lower strata of society. These changes have been brought about through land reform, job security, enforcement of minimum wages, pension benefits for agricultural laborers, reservation of places in educational institutions and on public bodies (including the legislature and the cabinet) for the economically and socially backward groups in the community, and similar policies.

Land reform was the principal means used to bring about a major redistribution of wealth. The first post-Independence legislative measure on land reform was adopted in 1957. It sought to assure permanent tenure to all tenants, to give tenants the right to purchase their land, and to impose a ceiling on the total acreage a primary family unit could own. The proposal aroused considerable opposition, and as a result of the agitation which

---

5/ A recent report in India Today (March 31, 1983, p. 33) illustrates this point. A resident of Kozhencherry village in Kerala became tired of waiting for his phone to be installed. He took his concerns to the High Court where the decision was in his favor: the junior engineer of the phone exchange was ordered to install the phone immediately. When no action ensued, the villager again went to court, and the engineer was cited for contempt. Finally, the phone was installed; however, the court remained unsatisfied, and in January 1983 found that the engineer had wantonly disregarded the original order. The court demanded that the engineer make an apology in public "as a deterrent to those who treat the orders of the court with callous disregard and indifference."

followed, the government was dismissed. The Land Reforms Act was finally passed in 1963, although its actual implementation was delayed several years more. By 1969 tenancy was altogether eliminated, and rental income from land was virtually abolished throughout Kerala. The 1969 amendments to the Land Reforms Act lowered the ceiling on landholdings to ten acres, removed some of the exemptions from the ceiling, and gave the "hutment dwellers" the right to purchase about one-tenth of an acre of land per household at a nominal price.

The impact of these land reforms on the distribution of wealth and income has not been fully evaluated. It is likely to be greater in the Malabar area than in the former Travancore-Cochin area. At one extreme, some of the rich Nair and Brahmin landlords were financially ruined and today live far below their former status and income, possessing only those tracts of land where they built their houses. At the other extreme, the hutment dwellers gained legal ownership to the land around their huts. Whether this has caused any real change in their income is, however, questionable. Eviction from the huts had in fact been banned in much of Kerala some years before the Land Reforms Act.[6/]

The land reforms created a large middle class of owner-cultivators. These people should have gained by the reforms, as they were no longer required to pay rents to their former landlords. But agrarian reforms simultaneously raised the wages and other benefits of farm workers. [7/] Since Kerala's middle-class farmers are accustomed to using hired labor for all their agricultural work, the higher wages increased the cost of cultivation considerably.[8/] At the same time, the prices of many agricultural products are controlled by the government. It is therefore doubtful whether land reforms have actually increased the income of middle-class farming families.

Agricultural laborers constitute almost 30 percent of Kerala's labor force (28 percent in 1981; see Government of India, Registrar General and Census Commissioner, 1983). They have benefited from the land reforms in two respects. Most of them used to live in houses located on land belonging to other people; they now have permanent rights to their house sites and to a

---

6/ In 1949, before the formation of Kerala State, the Travancore State Assembly passed legislation banning the eviction of hutment dwellers. Hutment dwellers are low-income households living in huts they have constructed on land belonging to others. They do not pay any rent for the land and are not eligible to use the land for farming.

7/ Average field labor wage rates in Kerala and India (based on data from the Government of India, Ministry of Agriculture) were:

Period	Rs./day	
	Kerala	India
1969-70	4.80	2.98
1978-79	7.32	5.28

8/ "...even on operational holdings of less than 0.5 acre about one-sixth of the rural households depend on hired labour for the bulk of the agricultural work." (United Nations 1975, p. 71)

piece of land immediately adjacent (ten cents in rural areas, much less in towns and cities). 9/ They can, therefore, live in their houses without fear of eviction and begin to cultivate fruit trees and vegetables on their household plots. These workers have also benefited from the Minimum Wage Act and other agrarian reforms that fix wages and conditions of work for all agricultural operations. The gains from higher daily wages have been partly offset, however, by losses due to reductions in the number of days a wage earner can find work and in employment opportunities for other family members, especially grown children.

> ...it is only in Kuttanad (Alleppey District) that I have heard workers talk about time spent harvesting in terms of 45 minutes or 1.5 hours (rather than in terms of days or at least half days as they do elsewhere). (Mencher 1980, p. 1787)

Given this situation, it is doubtful that the increase in the minimum wage is fully reflected in a higher average annual household income for agricultural laborers.

9/ 1 cent = 1/100th of an acre.

Chapter 3. Kerala State: Demographic and Family Planning Background

Kerala has a very dense population scattered fairly uniformly over the State, with few nodes of concentration. The population is rather well advanced in its demographic transition, with a high but rapidly declining rate of population growth, a high average age at marriage, a high level of family planning practice, a relatively low and declining fertility rate, a very low and very slowly declining mortality rate, and a high degree of population mobility. As noted in Chapter 2, the population is also fairly well advanced with regard to literacy and educational attainment, but it is only moderately successful in its economic transition, with nearly half the labor force still dependent on agriculture and a third dependent on daily wages from farming. Kerala's demographic profile as well as the official family planning program are described in some detail below.

Population Trends

Until recently Kerala's rate of population growth has always been higher than that of India (Table 3.1). Between 1901 and 1981 the State's population grew by 297 percent while that of India grew by only 187 percent. For the decade 1971-81, however, Kerala's annual growth rate of 1.7 percent was substantially lower than India's rate of 2.2 percent. Since the prospects for further decline in Kerala's growth rate are good, its proportional contribution to the population of India is likely to diminish in the years to come.

Table 3.1 Population growth in Kerala and India, 1901-81

Year	Population of Kerala (thousands)	Annual growth rate (percent)	
		Kerala	India
1901	6,396		
1911	7,148	1.90	0.56
1921	7,802	0.90	-0.03
1931	9,507	1.98	1.04
1941	11,032	1.50	1.33
1951	13,549	2.08	1.25
1961	16,904	2.24	1.95
1971	21,347	2.26	2.22
1981	25,454	1.74	2.22

Sources: Government of Kerala, Directorate of Economics and Statistics, 1980, Statistics for Planning 1980, Table 1.1; Government of India, Registrar General and Census Commissioner, 1981, Census of India, 1981, Provisional Population Totals, Series-1, Paper 2, Table 2.

Distribution

The State is divided into administrative districts, the number of which has recently been increased from 12 to 14, with Trivandrum the most southern and Cannanore the most northern. The population, density, and growth rate of these districts are shown in Annex Table 1. The districts vary in population size from half a million in Wynad to 2.8 million in Quilon and Cannanore. The density also varies substantially, from 192 persons per square kilometer in Idukki to 1,244 in Alleppey. The main reason for this variation is differences in topography.

Kerala is not a highly urbanized state. In 1981 only 18.7 percent of its population lived in urban areas, compared with 23.7 percent in India as a whole. There is no city in the State with a population of a million or more. The largest urban agglomeration is Cochin, with a total population of 686,000 in 1981; only six other towns have a population over 100,000, and only two of these have a population over 600,000. 1/

One of the distinguishing features of Kerala is the absence of rural-urban distinctions. There is no village system as is common in other States of India, nor any locality concept of a village. Houses are not clustered but scattered, with plenty of space in between the structures and with compound walls often separating them, in spite of the high density. The villages are administrative divisions only, with large populations compared to the Indian norm. Table 3.2 gives the distribution of villages by population size in Kerala and India. The contrast is very vivid.

Table 3.2 Distribution of villages by population size, Kerala and India, 1971

Size	Percentage of rural population, 1971	
	Kerala	India
Less than 1,000	0.1	37.9
1,000-1,999	0.1	25.8
2,000-4,999	2.6	23.8
5,000-9,999	13.7	7.5
10,000+	83.5	5.0

Sources: Government of Kerala, Director of Census Operations, 1972, Census of India, 1971, Series-9, Kerala, Part II-A, General Population Tables, State Table A-III; Government of India, Registrar General and Census Commissioner, 1971, Census of India, Part II-A, Census Tables on Population, Table A-III.

1/ "An urban agglomeration is by definition the continuous urban spread consisting of a core town and its adjoining urban outgrowths which may be either urban in their own right or rural." (Government of India, Registrar General and Census Commissioner, 1981, Series-1, Paper 2, p. 23).

Fertility

The crude birth rate in Kerala was about 40 per thousand population before 1950, but it is probably below 25 now. The trend is shown in Table 3.3. The birth rate started declining in the early 1950s, but this trend gathered momentum only in the second half of the 1960s.

The fertility rates associated with these birth rates are shown in Table 3.4. The total fertility rate was about 5.2 in 1959 and 3.4 in 1976, a decline of about 35 percent.[2/] In absolute terms, this is equivalent to a decline of 1.8 children per woman. From 1959 to 1971 the largest fertility decline was in the 15-19 age group, due largely to a decline in the proportion of this age group that was married. The varying declines noted among other age groups during 1971-76 should be due primarily to contraceptive practice. The fertility declines at older ages were very pronounced and may reflect the increasing frequency of sterilization among these women.

2/ The total fertility rate (TFR) is the average number of children that would be born to a woman if, during her childbearing years, she had the average number of births reflected in the age-specific fertility rates of a given year. The age-specific rates are derived by dividing the number of births to women of a certain age by the number of women in that age group.

Table 3.3 Crude birth rate in Kerala and India, 1931-81 (per thousand population)

Period	Kerala	India
1931-40	40	45
1941-50	40	40
1951-60	39	42
1961-70	37	41
1966	36	-
1967	34	-
1968	33	-
1969	32	-
1970	32	-
1971	32	37
1972	30	37
1973	27	35
1974	28	35
1975	28	35
1976	26	34
1977	25	33
1978	25	33
1979	26	33
1980	27	33
1981	26	33

Sources: Government of India, Central Bureau of Health Intelligence, 1981, Pocket Book of Health Statistics of India 1980, Table 7. Kerala estimates for 1931-40 to 1961-70 were prepared by Government of India, Census Actuary; those for 1966-81 are from the Sample Registration System (see Government of India, Vital Statistics Division, Ministry of Home Affairs, 1966-81, "Sample Registration Bulletin").

Table 3.4 Age-specific and total fertility rates in Kerala, 1958, 1971, and 1976

Age	1958-59 NSS 14th Round adjusted rates (rural)	1971 SRS (rural)	percent decline 1958-59 to 1971	1976 SRS (rural)	percent decline 1971-76	percent decline 1958-59 to 1976
15-19	87.5	48.4	44.7	42.7	11.8	51.2
20-24	237.9	210.8	11.4	193.4	8.3	18.7
25-29	291.8	223.3	23.5	202.3	9.4	30.7
30-34	205.0	173.2	15.5	137.1	20.8	33.1
35-39	161.8	116.7	27.9	80.7	30.8	50.1
40-44	46.7	42.8	8.4	25.3	40.9	45.8
Total fertility rate	5.15	4.07	21.0	3.41	16.2	33.8

Sources: Based on Government of India, Central Statistical Organization, National Sample Survey Report No. 89 (NSS 14th Round); Government of Kerala, Directorate of Economics and Statistics, 1980, Statistics for Planning 1980, Table 1.12.

Mortality

Kerala's death rate has always been much lower than that of India. The crude death rate was estimated to be about 25 per thousand population in the 1930s and about 7 in 1979. Much of the decline took place before 1970 (see Table 3.5). The largest gain over mortality was experienced in the infant ages. Reliable estimates of the infant mortality rate for earlier periods are lacking, 3/ but the estimates for 1951-60 onward are given in Table 3.6. The rate has been less than 50 in recent years.

The difference between India and Kerala with respect to infant mortality is very large indeed. For every thousand live births in 1979, 80 more babies died in India during the first year of life than in Kerala. To put it another way, a baby's chance of dying in India during the first year is almost three times as great as that of a baby born in Kerala.

Official estimates indicate that in the 1930s life expectancy at birth in Kerala was at the same level as in India, about 32 or 33 years; now Kerala's life expectancy of 65 years is about ten years higher than that of India. Ever since data have become available for Kerala, expectation of life at birth has been higher for females than for males. This is a great contrast with India, where males have had a higher expectation of life at birth. This favorable female mortality differential is reflected in the sex ratio of the total population of the State. Kerala is one of the few States in India in which the number of females has been greater than the number of males.

3/ The infant mortality rate (IMR) is defined as the number of infant deaths a year per thousand live births during the year.

Table 3.5 Crude death rate in Kerala and India, 1931-81 (per thousand population)

Period	Kerala	India
1931-40	25.0	31.2
1941-50	20.0	27.4
1951-60	16.1	22.8
1961-70	13.5	19.0
1971	9.2	14.9
1972	9.4	16.9
1973	8.7	15.5
1974	8.0	14.5
1975	8.5	15.9
1976	8.3	15.0
1977	7.5	14.7
1978	7.2	14.2
1979	6.9	12.8
1980	7.0	12.4
1981	6.9	12.5

Sources: As in Table 3.3.

Table 3.6 Infant mortality rate in Kerala and India, 1951-79 (per thousand live births)

Period	Kerala	India
1951-60	120	-
1965-67	74	-
1971	61	129
1975	57	140
1976	56	129
1977	50	129
1978	43	125
1979	44	125

Sources: Government of India, Central Bureau of Health Intelligence, 1981, Pocket Book of Health Statistics of India 1980, Table 14; Kerala estimates as in Table 3.3.

Migration

Migration is a relatively small factor affecting the size and distribution of population in Kerala; nevertheless, migration is a very important aspect of the socioeconomic life of the State.

Until 1931 more people came to Kerala than left. Since World War II the trend has reversed, and Kerala has become a State of net out-migration. The first Census of Kerala (1961) showed that 624,000 Kerala-born people were living outside the State, while 233,000 outside-born people were living in the State, making a net lifetime loss of 391,000. By 1981 these numbers had increased to 1.1 million, 356,000, and 756,000 respectively.

For more recent periods, emigration to West Asian countries has become an important component of migration from Kerala. Although the volume is not so large as the volume of out-migration to other parts of India (one estimate puts 208,000 Kerala migrants outside India and 302,000 outside Kerala but within India), the economic and social impact of West Asian emigration is much larger. The remittances to Kerala alone are estimated to be about US$200 million annually.

Internal migration, even rural-urban migration, is not very great in Kerala. This apparent lack of mobility is more than compensated by the increasing volume of commuting, particularly daily commuting for work and studies. A very rough indication of the magnitude of such commuting is given by the fact that the government bus transport service alone carried each person in Kerala an average of about six times a year in 1960, 15 times a year in 1970, and 28 times a year in 1980 (Government of Kerala, Directorate of Economics and Statistics, 1980, Table 12.7). Because of the cheap transportation service, commuting has replaced internal migration in the State.

Family Planning Program

The family planning program in Kerala has developed more or less along the same lines as elsewhere in India. But over the course of years the State has evolved certain innovative strategies, like the mass camps, which were later adopted in other parts of the country.

The program made a very modest beginning in 1955 with eleven Family Planning Clinics attached to medical institutions. The course of progress since then falls into four distinct phases: a period of slow growth (1955-64); a period of reorganization and the establishment of statewide Family Planning Centers (1964-70); the years of the mass sterilization camps (1970-73), and a period of intensified maternal and child health services (1973 onward).

Development of the Program

During the first phase of development, a State Family Planning Board was constituted (1958) to develop the policies and procedures of the program and to ensure their implementation. During the period 1956-61, 70

Family Planning Clinics were opened in the State, with facilities for sterilization in 53 institutions. During the next four years (1961-65), 50 more clinics started functioning, and Family Planning Centers were opened in 93 panchayats.[4/] In each of these centers, two social workers (one male and one female) were entrusted with the task of family planning education. The supervision of the program was vested in three new Regional Family Planning Officers. Later, 20 more facilities were opened and incentives for promoters and doctors were introduced. At various levels, committees were formed to help in the activities of the Family Planning Centers.

In 1964, on the basis of recommendations made by the Mukerjeo Committee, which was set up by the Government of India to review the organization and management of the family planning program, a network of service units and a hierarchy of administrative posts were established. A District Family Welfare Bureau at the District Headquarters, a State Family Welfare Bureau at the Directorate of Health Services, and a cell in the State Secretariat also started functioning. Under this new arrangement, urban centers were attached to various medical instituions. In rural areas a Family Planning Center was established in each Primary Health Center (PHC), and under each PHC, subcenters -- one per 10,000 population -- were opened. It was during this second phase that IUD and oral contraceptive programs were started.

The third phase, covering the period from the end of 1970 to April 1973, saw the conduct of mass sterilization camps. These camps not only proved to be pacesetters for the country as a whole, but were responsible in large measure for the popularity of sterilization in Kerala. Nine month-long camps were held during these years in seven of the then eleven districts in the State. The most ambitious and impressive in terms of achievement were the three camps in Ernakulam District (one of the districts included in the present survey), where the target was 85,000 sterilizations and the actual total was 93,254 sterilizations (110 percent of the target). Impressive results were also achieved in Palghat, another survey district, where the number of sterilizations (10,083) represented 101 percent of the target figure of 10,000. Although no camps were held in Alleppey, the third survey district, 25 percent of the acceptors in the second Ernakulam camp were from Alleppey.

An evaluation of the performance of the first two camps in Ernakulam revealed that the camps reached 22.5 percent of the couples in the district with two or more children. The camps demonstrated that what could

---

4/ A panchayat is the smallest administrative subdivision into which a district is divided. By 1982 the total number of Family Welfare Centers and Subcenters, formerly called Family Planning Centers and Subcenters, had risen to 1,485.

normally be achieved during a five-year period of official program activities could be accomplished in a single one-month camp.

The camps, however, had repercussions for subsequent program performance. In Ernakulam District, the average number of sterilization operations annually during the two-year period before the camps was 9,400; after the camps it fell to 5,500. But the drop was of short duration, lasting only two years. The Kerala experience showed that camps were a practical means to increase family planning acceptance.

The fourth phase of the historical development of the family planning program began with the abandonment of mass camps in 1973. This period is marked by greater integration of maternal and child health (MCH) services with an intensified family planning program, and by minicamps. Arrangements were made to ensure that the benefits of the MCH and nutrition programs reached the people in urban areas through the Family Planning Centers and those in rural areas through the subcenters. Facilities for female sterilization were extended to rural and semiurban areas. Some other features of the family planning program, like the hospital postpartum program and the medical termination of pregnancy, were also made available during this phase of development.

In 1976 a new and simple technique of female sterilization known as minilaporactomy was introduced in the State. This technique, which can be used at any time on a nonpostpartum basis and without hospitalization, has become very popular.

The oral pill program was started in 1968-69 as a pilot project in a few selected centers. It now operates in 163 rural and 42 urban Family Planning Centers, but the number of women who have accepted the pills was only 1,071 during 1975-76 and 271 during 1979-80. Oral pills are also distributed in nine other centers administered by eight voluntary organizations and one local body.

Another innovation during this fourth phase was the multipurpose Health Workers Scheme. According to this arrangement, the existing lower-level staff of various centers are pooled and designated as Male and Female Health Workers. Each of these health workers covers a population of 5,000 to 7,000 and serves all the health needs of these people. The offer of integrated health services is effected at both the peripheral and supervisory levels. The scheme has been introduced in two districts of the State.

The conduct of Family Welfare Fortnights, two weeks set aside once a year by the State government to promote the family planning program, has been a regular feature since 1966. Their observance helps to create an awareness of the population problem among the family planning workers and encourages their enthusiasm for the work. Since 1974 the fortnights have also been used for conducting minicamps, which are held by each of the Primary Health Centers or by a group of Centers that pool their resources.

Delivery of Services

The State Ministry of Health guides and supervises the family planning program in the State. A State Cabinet Subcommittee on Family Welfare develops policies and reviews program progress, while a Family Welfare Council consisting of official and nonofficial members with the Health Minister as chairman serves an advisory function. A Deputy Secretary, under the guidance of the Secretary to Government, State Health Department, has overall responsibility for the program. Technical supervision is vested with the Director of Health Services at the state level, and with the District Medical Officer at the district level. The State Family Welfare Bureau and District Family Welfare Bureau are in direct charge of the work (Figure 3.1).

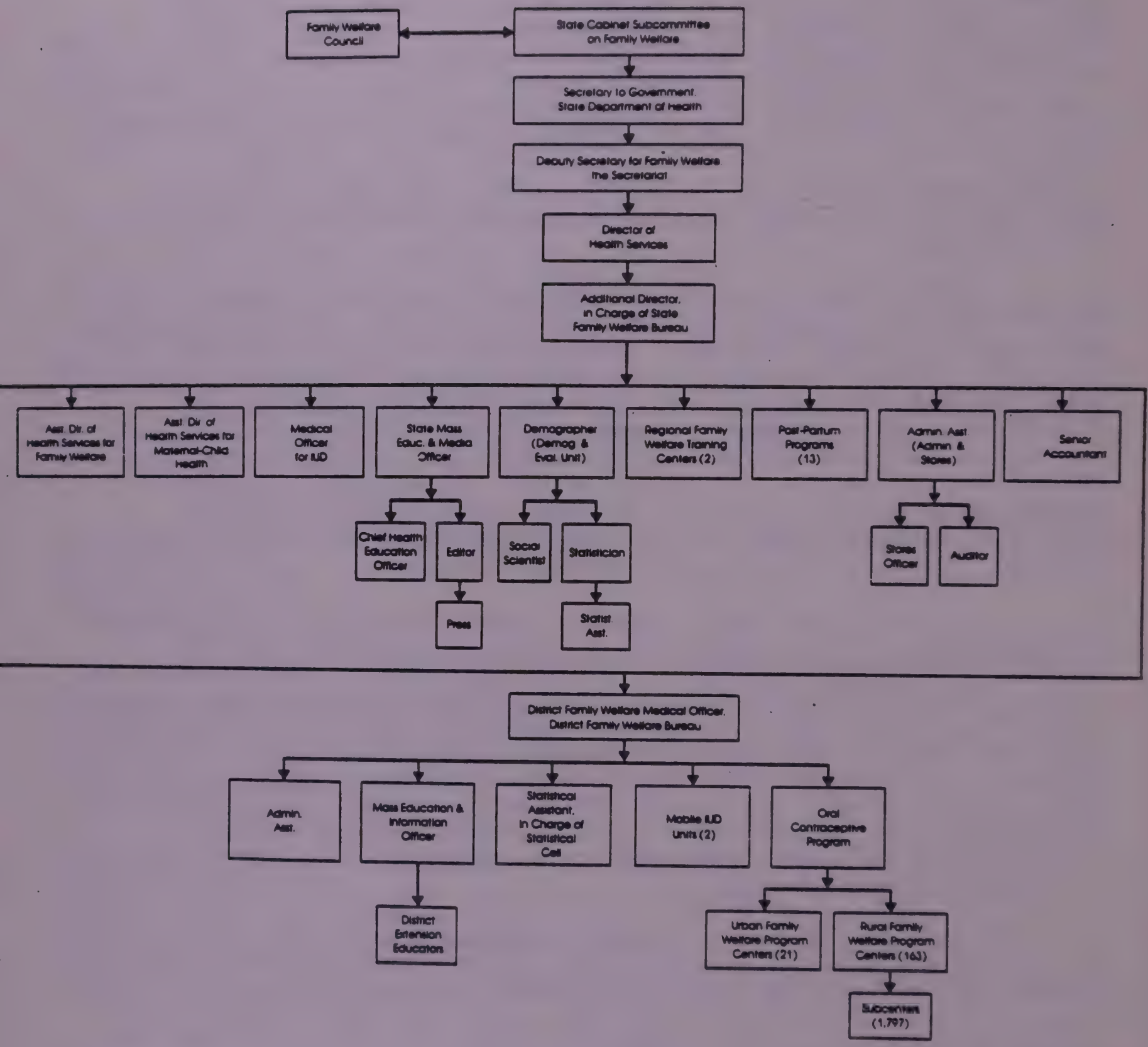
Delivery of the many family planning services is centered around the various types of activities undertaken by the subcenters, the Primary Health Centers (rural and urban), District Hospitals, and other hospitals attached to Medical Colleges. At the subcenter level, couples are advised about the Family Welfare Program, and conventional contraceptives are distributed. Each subcenter is managed by an Auxilliary Nurse Midwife who has both clinical and extension work training. She assists the Medical Officer in IUD insertions and follows up with the acceptors. During her routine house visits, she advises and guides mothers and children on nutrition, sanitation, immunization, and the importance of limiting family size.

At the Primary Health Centers, besides distribution of conventional contraceptives, there are facilities for vasectomy operations and IUD insertions (in a limited number of PHCs, the tubectomy operation is also done). A Medical Officer, who may be male or female, provides the necessary leadership, ensures coordination of work among the staff, maintains liaison with other agencies, and ensures that supplies of medicines and contraceptives are available. Organizing minicamps and training camps, performing vasectomies, and providing follow-up services also fall within the Medical Officer's responsibility. A female Medical Officer assists the Medical Officer in meeting the needs of the community and in educating the public about family planning.

With the increased attention to extension activities, the budget of the program has been increased from year to year. The expenditure during 1958-59 was just under Rs. 200,000; by 1964-65 (the year of a major reorganization) it rose to Rs. 3,680,000, and it has shown a steadily upward trend ever since. The total expenditure for 1979-80 was Rs. 55,550,000 (or about US$6 million).[5/]

[5/] The January 1982 exchange rate was US$1 = Rs. 9.198.

Figure 3.1:
FAMILY WELFARE PROGRAM
Organizational Chart


Family Welfare Council
State Cabinet Subcommittee on Family Welfare
Secretary to Government, State Department of Health
Deputy Secretary for Family Welfare, the Secretariat
Director of Health Services
Additional Director, in Charge of State Family Welfare Bureau
Asst. Dir. of Health Services for Family Welfare
Asst. Dir. of Health Services for Maternal-Child Health
Medical Officer for IUD
State Mass Educ. & Media Officer
Demographer (Demog & Eval. Unit)
Regional Family Welfare Training Centers (2)
Post-Partum Programs (13)
Admin. Asst. (Admin & Stores)
Senior Accountant
Chief Health Education Officer
Editor
Press
Social Scientist
Statistician
Statist. Asst.
Stores Officer
Auditor
District Family Welfare Medical Officer, District Family Welfare Bureau
Admin. Asst.
Mass Education & Information Officer
Statistical Assistant, In Charge of Statistical Cell
Mobile IUD Units (2)
Oral Contraceptive Program
District Extension Educators
Urban Family Welfare Program Centers (21)
Rural Family Welfare Program Centers (163)
Subcenters (1,797)

World Bank—29034

Over the years the major portion of the budget for the Family Welfare Program has been spent on services rendered. During the period 1959-76, 85 percent of funding went for this purpose; the comparable figure for 1976-80 is 91 percent.[6/] Administrative and other overhead costs have decreased while spending for direct program activities has increased. Detailed expenditures since 1952 are given in Annex Table 2.

Incentives

An incentive in the context of the Family Welfare Program is the direct payment, in money or in goods, by the government or another organization to an individual, couple, group, or institution for the purpose of promoting contraceptive practice. Incentives are offered to acceptors to compensate for the loss of wages in the process of family planning acceptance, and they may be offered to the motivators and service-rendering personnel as well. Apart from money, incentives have included such items as transistor radios, cycles, lunkies, and sarees. Voluntary organizations (Lions Club, Rotary Club, and so on) have at times supplemented government efforts. The rates for the monetary incentives paid by the government, as shown in Tables 3.7 and 3.8, have varied depending on who has received them and the type of family planning method adopted. The rates were revised upward in 1977.

Table 3.7 Rates of incentive payments, 1966-67 (Rs.)

Recipient	Vasectomy	Tubectomy	IUD
Acceptor	21	29	5
Medical Officer	3	3	2
Anesthetist	..	2	..
Promotor	2	2	1
Drugs, etc.	2	2	2
Service	2	2	1
Total	30	40	11

Source: Provided by the Government of Kerala, State Department of Health, State Family Welfare Bureau.

6/ This represents the percentage of the total expenditure that went for all budgetary items excluding transportation, construction, and administration.

Table 3.8 Rates of incentive payments, 1977 (Rs.)

Recipient	Vasectomy	Tubectomy	IUD
Acceptor	70	70	6
Drugs	10	15	-
Diet	5	20	-
Transport	5	5	1.50
Miscellaneous	10	10	0.50
Total	100	120	8.00

Source: As in Table 3.7.

Prior to 1977 a fee of Rs. 5 was paid to the motivator for each case of sterilization. When the State contribution to the miscellaneous purpose fund ceased, however, the payment of this motivation fee was dropped. Later it was revived at the rate of Rs. 3 per case of sterilization in conjunction with the minicamps and the Family Welfare Fortnights. Again in July 1979 the rate of the motivation fee was modified: Rs. 6 was paid for all cases of vasectomy promoted and Rs. 3 for all cases of female sterilization promoted in the camps.

In 1981 payment of monetary incentives was made to Family Welfare personnel for each sterilization done in the camps. The following rates were established:

Medical Officer	Rs. 3
Nurse/Auxiliary Nurse Midwife	Rs. 1
Nursing Assistant	Rs. 1
Stretcher Bearer	Rs. 0.50
Barber (preparation)	Rs. 0.50

At the time of the special Family Welfare Campaign organized from January-March 1981, additional incentives were given to acceptors as well as to motivators. Accordingly, each acceptor of sterilization received Rs. 10, while each promoter of sterilization received a bonus of Rs. 4, for a total motivation fee of Rs. 10 for each vasectomy and Rs. 7 for each female sterilization. Corporation Councils, Municipal Councils, and the Gurufayur Township Committee were also asked to pay incentives to all persons who underwent sterilizations in their areas at the enhanced rate of Rs. 50. Voluntary organizations contributed additional money or goods to the acceptors and motivators of family planning in their areas.

In collaboration with the Labor Department a novel scheme called the Voluntary Promotors' Scheme, a part of the Employment Generation Scheme, was launched during the year 1979-80. Educated, unemployed, satisfied acceptors with the prescribed qualifications were selected as Voluntary

Promotors. They were given incentives at the rate of Rs. 10 for each sterilization promoted and Rs. 5 for each IUD insertion promoted in the area allocated to them. This scheme continued until 1980-81.

The incentives paid to acceptors, motivators, and the service-rendering personnel have greatly asssisted in spreading contraceptive practice in the State.

Impact on Fertility

A "cafeteria" approach is followed in the State for the delivery of supplies and services. A variety of methods are offered to the public for their choice after proper consultations: male and female sterilization, IUD, conventional contraceptives (condoms, diaphragms, jelly/cream tubes, foam tablets), and oral pills. A review of the results over the years shows that sterilization is the bulwark of the program. The progress of IUD acceptance has been checkered. Conventional contraceptives other than condoms are practically unused. Pregnancy termination, though not offered as a family welfare measure when introduced in 1972, is becoming more and more popular.

The number of sterilizations (both male and female) during the initial years was small, rising gradually from 679 in 1957 to 21,904 in 1964. In the years of the mass sterilization camps (1970-73), the annual figure exceeded 100,000 several times. The highest number ever recorded during a single year was in 1976, when 266,000 sterilizations were done. After some slowdown in 1978 and 1979, the 1980 performance was much better, reaching a provisional total of about 104,000 sterilizations. The cumulative total of all sterilizations done through 1980 is almost 1.5 million.

Detailing the total number of sterilizations by the sex of the acceptor shows some interesting changes over the years. From 1957 to 1973, the number of vasectomies (male sterilizations) outnumbered tubectomies (female sterilizations), accounting for as much as 84 percent of total sterilizations in 1966. But since 1974 there has been a reversal of the trend, the number of tubectomies exceeding the number of vasectomies in every year except 1976. During 1978-80 the number of tubectomies was more than five times the number of vasectomies. The recent spurt in tubectomies is due to the introduction of minilaporactomy, which makes female sterilization very much simpler than it used to be.

The IUD was introduced in 1965. After an encouraging initial start, acceptance was low by 1973. Some gains were seen from 1974 through 1976, but since 1977 the number of acceptors has again decreased to below 20,000 a year.

The use of conventional contraceptives is mostly confined to condoms (Nirodh). Of late, the use of other methods has been practically discarded. The number of conventional contraceptives distributed each year is converted to the number of users through a norm adopted by the Government of India. The norm is applied by dividing the total distribution of condoms

by 72, of diaphragms by 2, of jelly/cream tubes by 7, and of foam tablets by 72. These norms are based on the average number of products necessary for a couple to have complete protection over a year. There has been a steady increase in the number of users of these methods since 1973, as is detailed in Table 3.9.

Several factors must be considered when estimating the number of births averted by acceptors of the different methods. These considerations include: the differential efficiency of the methods, the carryover effect of some of the methods, the mortality of either spouse, the possibility of expulsion or removal as in the case of IUDs, and changes in the age structure of acceptors of IUDs and sterilization (both male and female). The estimates given in Annex Table 3 are based on the age-specific marital fertility rates obtained from the National Sample Survey for 1959-60, adjusted to correspond to a birth rate of 38.9 per thousand (estimated from the Census for 1951-60). These estimates show that by 1978 a total of 1,736,000 births, and by 1980 a total of 2,238,000 births, had been averted in the State. These figures, in turn, are used in Table 3.10 to calculate the impact of the family planning program on the crude birth rate.

Table 3.9 Achievement record of family planning methods, Kerala, 1957-80

Year	Vasectomy	Tubectomy	Total sterilizations	IUD	CC users a/	Equivalent Sterilizations
1957	521	158	679	-	-	679
1958	1,633	1,507	3,140	-	-	3,140
1959	4,132	2,236	6,368	-	-	6,368
1960	3,079	1,953	5,032	-	-	5,032
1961	3,578	2,939	6,517	-	-	6,517
1962	4,182	2,916	7,098	-	-	7,098
1963	10,395	2,830	13,225	-	-	13,225
1964	17,938	3,966	21,904	-	-	21,904
1965	36,102	6,532	42,634	23,062	-	50,321
1966	33,251	6,147	39,398	43,517	-	53,903
1967	49,489	10,504	59,993	36,887	-	72,288
1968	64,081	14,066	78,147	39,742	-	91,394
1969	42,578	17,982	60,560	36,866	-	72,840
1970	48,847	20,592	69,439	32,559	9,650	80,828
1971	76,141	24,192	100,333	19,521	7,824	107,274
1972	73,683	30,374	104,057	21,719	4,522	111,548
1973	48,448	35,707	84,155	15,690	11,797	95,939
1974	15,056	41,174	56,230	26,039	14,104	72,746
1975	22,823	48,981	71,804	22,720	17,228	88,948
1976	186,037	80,434	266,471	24,961	8,939	275,288
1977	33,216	76,472	109,688	11,468	20,996	114,677
1978	14,283	73,256	87,539	10,930	21,672	92,386
1979	15,573	80,507	96,030	14,663	19,288	102,039
1980	15,439	89,088	104,527	19,174	17,778	111,906
Total	806,505	674,513	1,475,028	399,518	153,798	1,658,288

a. CC - conventional contraceptives.
b. Sterilizations plus one-third of IUD insertions and one-eighteenth of CC users.

Source: Provided by the Kerala State Family Welfare Bureau, Directorate of Health Services, Trivandrum.

Table 3.10 Mid-year population, births averted, and crude birth rate, Kerala, 1961-80

Year	Mid-year population (thousands)	Mid-year births (based on CBR=38.9) a/	Hypothetical CBR if not for Family Welfare Program	Number of births averted	Estimated decline in CBR	Estimated CBR with effects of Family Welfare Program
1961	17,015	678,134	39.86	3,887	0.23	39.63
1962	17,459	687,061	39.35	5,291	0.30	39.05
1963	17,903	695,987	38.88	6,902	0.39	38.49
1964	18,347	704,913	38.42	9,963	0.54	37.88
1965	18,791	713,839	37.99	16,331	0.87	37.12
1966	19,235	722,765	37.58	30,645	1.59	35.99
1967	19,679	731,691	37.18	45,834	2.33	34.85
1968	20,123	740,617	36.80	62,909	3.13	33.67
1969	20,583	749,543	36.45	80,979	3.94	32.51
1970	21,007	758,469	36.11	93,014	4.43	31.68
1971	21,489	768,726	35.77	111,012	5.17	30.60
1972	21,861	791,913	36.22	128,277	5.87	30.35
1973	22,361	813,316	36.37	143,941	6.44	29.93
1974	22,866	834,719	36.50	168,270	7.36	29.14
1975	23,372	856,122	36.63	160,760	6.88	29.75
1976	23,814	875,432	36.76	190,870	8.02	28.74
1977	24,371	888,464	36.61	234,426	9.62	26.99
1978	24,686	901,496	36.52	243,016	9.84	26.68
1979	25,089	914,528	36.45	245,924	9.80	26.65
1980	25,480	927,560	36.40	255,622	10.03	26.37

a. CBR - crude birth rate.

Source: Kerala State, Population Research Centre, Directorate of Economics and Statistics, 1980. "Note on the Calculation of Births Averted and Couples Protected Due to Family Welfare Programme in Kerala" (unpublished).
Additional information on births averted by contraceptive method is given in Annex Table 3.

Induced Abortion

Until recently induced abortion was illegal in Kerala and punishable under the Indian penal code except under special circumstances. The law was changed by the Medical Termination Act of India, 1971, which was made effective from 1 April 1972. This Act provides for the termination of pregnancy if its continuance poses a risk to the life of the pregnant woman or a threat of grave injury to her physical or mental health. Since the failure of any contraceptive device or method is also a valid reason to terminate pregnancy, however, an abortion may be obtained on request, thereby aiding population control.

The medical termination of pregnancy (MTP) is done only in approved medical institutions, the number of which has been gradually increased. At present, 77 government and 51 private institutions are approved for this purpose. Pregnancies which do not exceed 12 weeks may be terminated by one registered medical practitioner. Two medical practitioners are required if the length of pregnancy is more than 12, but less than 20, weeks.

The MTP program has been well received, especially by women. From a mere 1,084 acceptors in 1972-73, the number rose to 32,597 in 1979-80, as shown in Table 3.11. During the course of eight years, over 150,000 persons have accepted MTP.

Table 3.11 Number of MTP acceptors in Kerala, 1972-80

Year	Acceptors
1972-73	1,084
1973-74	4,244
1974-75	9,564
1975-76	19,969
1976-77	25,389
1977-78	30,834
1978-79	27,830
1979-80	32,597
Total	151,511

Source: As in Table 3.10.

Part Two. Major Findings

The research design of this project involved the collection of survey data suitable for an analysis of the determinants of the recent fertility decline in Kerala. As pointed out earlier, it was deemed consistent with the study's objectives to limit the field investigation to three districts of Kerala State - Palghat, Ernakulam, and Alleppey. Each district has its distinctive features. Palghat is the new "rice bowl" of Kerala. The economy of the district is marked by the predominance of agricultural laborers and the absence of any industry, modern or traditional. Ernakulam, with its modern port of Cochin and large number of modern industries, represents the emerging industrial society of Kerala. Alleppey is the old rice bowl of Kerala; its economic scene is dominated by agricultural laborers. But unlike Palghat, the number of workers in traditional industries like coir (making products from coconut fiber) and fishing is substantial. Alleppey was the center of industry, trade, and commerce for the former State of Travancore, but it has slipped from its prime position with the emergence of Cochin as an important center on India's west coast.

Available data from other sources reveal that the fertility rate in Palghat is relatively high. The fertility level of the other two districts is low, with only slight differences between them. Service statistics from the family planning program in these districts show considerable variation in the rate and trend of acceptance, as well as in the mix of various family planning methods used.

From each of these three districts, a sample of about 1,000 households was selected. The people interviewed included approximately 2,700 ever-married women, 800 never-married women, 1,000 currently married men, and 1,000 never-married men. Information about the exact number of households covered and the number of respondents by category is given in Table 4.1, together with an overview of the types of data collected.

ble 4.1 Households and respondents surveyed

me of istrict	Number of households covered	Number of respondents selected (S) and interviewed (I)							
		EMW		NMM		NMW		MM	
		S	I	S	I	S	I	S	I
lghat	1,011	968	907	236	209	196	176	318	293
rnakulam	1,009	908	878	543	433	337	318	490	394
lleppey	1,043	960	933	404	383	316	307	345	329
otal	3,063	2,836	2,718	1,183	1,025	849	801	1,153	1,016

Notes: EMW = ever-married women; NMM = never-married men; NMW = never-married women; nd MM = currently married men.

Fertility and related data were collected from the sample households using five chedules:

I. Household Schedule

- basic demographic information (8 questions)
- information about housing, household assets, distance to facilities (26 questions)

II. Schedule on ever-married women

- general characteristics of women (7 questions)
- marriage history, attitudes (32 questions)
- maternity history (34 questions)
- contraceptive knowledge (23 questions)
- fertility regulation (30 questions)
- work history and attitudes about children's education, work, old age support, etc. (44 questions)
- husband's background (42 questions)

II. Schedule on never-married men (20-39 years)

- socioeconomic characteristics (14 questions)
- attitude about marriage (13 questions)

V. Schedule on never-married women (18-34 years)

- socioeconomic characteristics (14 questions)
- attitude about marriage (13 questions)

V. Schedule on currently married men:

- attitude about marriage (20 questions)

The fertility data consisted of the number of children ever-born by the date of birth of each event. The date of death of each child not surviving to the survey date was also reported, thereby yielding information on infant and child mortality. With respect to family planning, the survey collected data on knowledge, ever-use, and current use of each family planning method. Information on marriage included the age at marriage of those who were married, and the ideal age at marriage for boys and girls according to both married and unmarried adult males and females. In addition, information was collected on the reasons for early or late marriages and on attitudes toward marriage. Finally, information on housing, education, caste and related social distinctions, occupation, and income of both men and women was included in the survey.

The field investigation was carried out from January to June 1980 by a field staff consisting of fifteen female and three male interviewers, supervised by staff from the Kerala State Bureau of Economics and Statistics. A post-enumeration survey was conducted by the supervisors soon after completion of the field work, using a sample of 60 households in each district. The results indicated that the data collected were of good quality.

The general methodology adopted for the study of this data was as follows:

First, the fertility level, trend, socioeconomic differentials, and trends in fertility differentials by socioeconomic group were estimated.

Second, the increase in age at marriage, trend in contraceptive practice, and differentials in age at marriage and contraceptive practice were estimated, as well as the impact of increases in the age at marriage and in contraceptive practice on fertility trends for recent periods.

Third, a multivariate analysis was carried out in which the dependent variables were fertility and fertility-related factors, while the independent variables were demographic and socioeconomic factors (individual and household).

Fourth, a theoretical framework was proposed to explain the observed facts.

Fifth, the various hypotheses developed on the basis of the theoretical framework were tested using survey data.

Part Two of this book is a presentation of the findings of the fertility survey. Chapter 4 reports on fertility levels and trends in Kerala State, while Chapters 5, 6, and 7 focus on three primary determinants of fertility trends: desire for children, age at marriage, and family planning practice. Each of the four chapters in Part Two opens with a listing of the principal conclusions suggested by the collected data and then proceeds to a detailed review of the findings and their relation to a number of demographic and socioeconomic factors. In addition, summaries are provided of the multivariate analyses carried out to help identify which factors best explain the observed differentials. The description and testing of the theoretical framework are reserved for Part Three.

Chapter 4. Fertility Trends

Information on fertility levels and trends is available from two questions in the survey: that regarding the age distribution of the household, and that regarding children ever-born by date of birth of each child, age of woman, and her age at marriage. The survey data show that the fertility decline has indeed been substantial. For the period 1975-80 the estimated crude birth rate (projected for the State as a whole) was 25, the same figure reported for 1978 by the Sample Registration System, a reliable source for fertility trends in Kerala State. The principal conclusions regarding the fertility trends and differentials for the three survey districts are summarized below.

- The total fertility rate (TFR) declined from 5.9 in 1965-70 to 3.7 in 1975-80, a decrease of 38 percent; the marital fertility rate (TMFR) declined between the same two periods from about 7.5 to 5.7, a decrease of 24 percent.

- Cohorts of women born after Indian Independence (1947), who are the same as those who got married after the implementation of land reforms and intensification of the family planning program in Kerala (that is, after 1965), had a distinctly lower fertility level than women born before Independence or married before the implementation of the land reforms or the intensification of the family planning program.

- Fertility decline occurred in all major socioeconomic groups--rich and poor, educated and illiterate, Hindus and Muslims, Nairs and Scheduled Castes. In general, the decline has been greatest in the middle-level socioeconomic group. For example, the fertility decline was highest among neither the most nor the least educated but among women with 1-4 years of schooling.

- Length of schooling of women has had a consistently negative relation to fertility, except during 1970-75 when much of the fertility decline in the survey districts was due to camp-induced sterilizations.

- Caste has a statistically significant effect on fertility even when controlled for education and all other variables.

- There is no evidence of a negative relationship between fertility and economic indicators. In general, however, the correlation between the two has become weaker in recent years.

- On the whole, fertility differentials have narrowed in recent years.

Fertility Rates

Before trying to understand the determinants of fertility changes in a population, it is essential to specify as accurately as possible just what the fertility changes are. In this section, an effort is made to measure the fertility levels, trends, and differentials in Kerala in recent years by deriving them from the collected survey data. A variety of measurements is used; taken together, they provide a fairly consistent picture of the dimensions and characteristics of Kerala's overall fertility decline.

Crude Birth Rate

The age distribution of the household population can be manipulated to derive crude birth rates for recent years. The observed age data are strongly suggestive of a sharp decline in the birth rate in all the survey districts. Table 4.2 gives the proportion of the population in the three youngest age groups compared with a stable age distribution. The percentages are relatively low, indicating a fairly low fertility rate, close to a gross reproduction rate of 1.5.[1/]

Table 4.2 Percentage of population in the younger age groups by district, Kerala, 1980

Age	Palghat	Ernakulam	Alleppey	Total	Stable age distribution a/
0-4	11.5	9.4	8.6	9.8	12.5
5-9	12.8	9.9	10.1	10.9	11.1
10-14	13.7	12.3	13.1	13.0	10.1
0-14	38.0	31.6	31.8	33.7	33.7

a. Stable age distribution features a gross reproduction rate of 2.0 and a mortality level of 18 (see Coale and Demeny 1966).

The proportion of population aged 0-4 years is lower than that aged 5-9, which in turn is lower than that aged 10-14. If the fertility pattern had been constant, the trend would have been the opposite--with each older age group representing a lower proportion of the total population (as in the last column in Table 4.2). The trend of an increasing proportion of the population in each higher age group (among those below the age of 15) is a clear indication of a decline in the birth rate during the 15-year period prior to the survey.

1/ The gross reproduction rate is the average number of daughters a woman would have if she passed through her childbearing years conforming to the age-specific fertility rates of a given year.

How great is the decline in the birth rate, and what is its current level? A simple calculation of the birth rate by the reverse survival method gives some approximate answers. The results are shown in Table 4.3.

Table 4.3 Crude birth rate by district, Kerala, 1965-80
(per thousand population)

Period	Palghat		Ernakulam		Alleppey		Three districts combined	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
1965-70	41.1	41.7	36.9	34.0	40.1	36.1	39.3	37.0
1970-75	33.8	33.7	26.2	25.2	26.5	25.0	28.7	27.8
1975-80	26.8	26.6	21.8	21.3	20.0	19.5	22.8	22.5

Notes:

(1) Reverse survival method using a growth rate of 2 percent and mortality levels of 17.2, 18, and 18.8 (South model).

(2) Reverse survival method (all ages) using mortality alone (same as above). Estimates by this method are considered more reliable in this case.

For the period 1975-80 the crude birth rate for the three districts together was only about 22.5 per thousand population, a rate supported by both methods. Additional credibility for this rate is obtained by comparing the survey rate with the Indian Government's Sample Registration System (SRS) rate, which is an entirely independent source of data for births. 2/ This comparison is given in Table 4.4.

2/ See Government of India, Vital Statistics Division, Ministry of Home Affairs, "Sample Registration Bulletin," volumes for 1975-80.

Table 4.4: Comparison of survey and SRS birth rates (per thousand population)

District	Survey rate (1975-80)	SRS rate (1978)	Difference
Palghat	26.6	26.9	-0.3
Ernakulam	21.3	20.9	0.4
Alleppey	19.5	21.4	-1.9
Three districts combined	22.5	23.5	-1.0
Estimate for Kerala State	24.4	25.5	-1.1

There is little doubt that the crude birth rates of Alleppey, Ernakulam, and Palghat districts are relatively very low. Their average, about 23 births per thousand population, is approximately the same as the birth rate of the Republic of Korea for the same period (see Table 4.5). It is slightly lower than the rate for Kerala State as a whole, which according to the SRS is about 8.5 percent higher.[3/] The Kerala birth rate as estimated from the survey data should be about 25 births per thousand population.

Table 4.5: Crude birth rate, Kerala and selected economies in Asia, 1975-80 (per thousand population)

Place	Birth rate
Three survey districts	22.5
Kerala State	24.4
Singapore	17
Hong Kong	19
Republic of Korea	25
Sri Lanka	28
India	35

Source: Estimates for other countries taken from United Nations 1981, World Population Prospects as Assessed in 1980, Population Studies No. 78, Table A-6, p. 48.

3/ Derived by comparing the SRS rate for Kerala with the SRS rate for the three survey districts.

Children Ever-Born

It is also possible to calculate the fertility rate from children ever-born. In the survey, ever-married women were asked the date of birth of each of their children in addition to their own dates of birth and marriage. The average number of children ever-born (parity) by age of the woman is shown in Table 4.6. The average at ages 45-49 is the completed fertility or the (cohort) total fertility rate (TFR) of women born during 1930-35.

Table 4.6 Average number of children ever-born by age of woman and district, Kerala

Age of woman	Palghat	Ernakulam	Alleppey	Three districts combined
15-19	0.53	0.44	0.23	0.47
20-24	1.31	1.45	1.21	1.22
25-29	2.36	2.20	2.06	2.21
30-34	3.32	3.04	3.05	3.15
35-39	4.50	3.60	4.27	4.11
40-44	4.74	5.37	4.73	4.93
45-49	5.37	5.27	5.22	5.28
All	3.39	3.22	3.46	3.36
Standardized	3.56	3.38	3.37	3.37

The completed fertility of women in the three survey districts combined is 5.3, with little variation among the districts. The figure is slightly higher in Palghat and lower in Alleppey, the same pattern exhibited by the crude birth rate and similar to that exhibited by the standardized average parity. (The unstandardized average parity shows a different pattern.) These parity data indicate that in the past the total fertility rate in Kerala was at least 5.3; that among the three districts studied, the fertility level has been highest in Palghat and lowest in Alleppey; and that the fertility differentials between the three districts have been relatively small.

All ever-married women in the survey were also classified by duration of marriage. The average number of children ever-born in each group is given in Table 4.7.

Table 4.7 Average number of children ever-born by duration of marriage and district, Kerala

Duration of marriage (years)	Palghat	Ernakulam	Alleppey	Three districts combined
0-4	0.54	0.72	0.56	0.65
5-9	1.75	1.89	2.02	1.90
10-14	2.88	2.75	2.78	2.81
15-19	3.96	3.83	3.81	3.87
20-24	5.26	4.56	4.77	4.86
25+	5.81	5.32	5.66	5.58
All	3.66	3.45	3.31	3.48
Standardized	3.57	3.36	3.48	3.48

Note: Some women surveyed have given their age but not their age at marriage, contributing to differences in the totals between this table and Table 4.6.

The pattern of variation by district and duration of marriage is somewhat similar to that noted above for age. The standardized average parity is highest in Palghat and lowest in Ernakulam. An average married woman has a completed fertility of 5.6 children. This is slightly higher than the estimate given in Table 4.6 because the denominator excludes unmarried women.

Specific Fertility Rates

Information on the date of birth of each child makes it possible to estimate specific fertility rates for different periods of time. The rates for the three most recent five-year periods, given in Table 4.8, were derived from marital fertility rates (see Annex Table 4) and proportions of women married.

Specific fertility rates for 1975-80 together with the household age-sex composition yield an estimated crude birth rate of 25.3, which is higher than both the estimate obtained by the reverse survival method and the SRS rate (see Tables 4.3 and 4.4). This indicates that the SRS underenumerates 7 percent of the births in Kerala.

Table 4.8 Age-specific and total fertility rates, three districts combined, Kerala
(per thousand population)

Age	1965-70	1970-75	1975-80	Percent decline 1965-70 to 1975-80
15-19	52	37	22	58
20-24	269	219	176	35
25-29	313	253	235	25
30-34	242	200	146	40
35-39	189	121	100	47
40-44	(93)	70	47	49
45-49	(23)	(17)	11	52
Total fertility rate	5.905	4.585	3.685	38

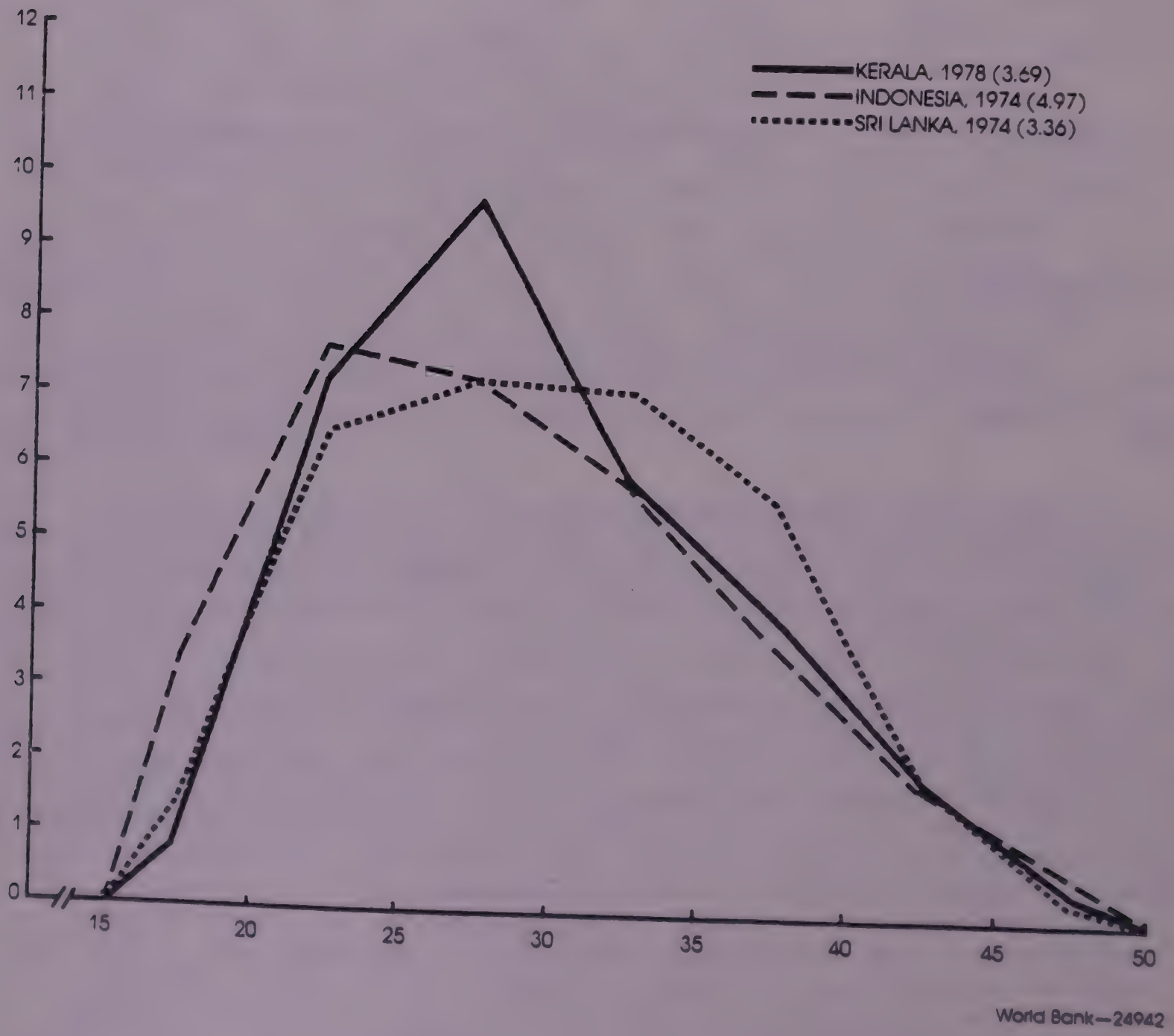
Note: The rates in parentheses are very rough estimates based on trends in previous age groups. Additional information on age-specific marital fertility rates is given in Annex Table 4.

Fertility Pattern

The total fertility rate (TFR) for the three survey districts for 1975-80 is estimated to be about 3.69 (Table 4.8), which is higher than the rate in Sri Lanka, Singapore, Hong Kong, Korea, or Taiwan, China for recent periods.

Figure 4.1 compares the age pattern of the fertility curve for Kerala with those of Indonesia and Sri Lanka using World Fertility Survey data. In Kerala the fertility rate reaches its maximum at ages 25-30 years. The difference between the rate at ages 25-30 and the rates for neighboring age groups is substantial. This is in sharp contrast to the Sri Lanka pattern, which is more or less flat at ages 20-25, 25-30, and 30-35. Even in the age group 35-40 the Sri Lanka rate is not far below the peak value. In the younger age groups (15-19 and 20-24), the pattern in Kerala resembles that in Sri Lanka but contrasts with that in Indonesia. At older ages, however, the Kerala pattern is quite similar to that in Indonesia. In fact, at ages above 30 years the curves for Kerala and for Indonesia are identical. This is somewhat surprising in view of the differences in the fertility rates of these populations (the TFR is 4.97 in Indonesia and 3.69 in Kerala). The differences and similarities should be attributable to the causes of the fertility decline. Age at marriage, which plays a principal role in fertility decline at younger ages, is similar in Kerala and Sri Lanka. At older ages, family planning practice is the immediate cause of fertility decline. In this respect, Sri Lanka and Kerala differ considerably, both in the extent of family planning and the methods used. Hence, the fertility patterns in Kerala and Sri Lanka are quite similar at younger ages, but very divergent at older ages. The similarities between Indonesia and Kerala at ages above 30 years should be related to a similarity in the extent and type of family planning practice.

Figure 4.1
FERTILITY PATTERNS IN KERALA AND SELECTED ASIAN COUNTRIES



World Bank—24942

Trends in Fertility Rates

The total fertility rate for the three districts of Kerala combined declined from 5.91 in 1965-70 to 3.69 in 1975-80 (Table 4.8). This means a decline of 2.2 children per woman, or of 38 percent over a ten-year period, an average decline of 4.7 percent a year. This is an extremely rapid decline, but by no means unprecedented. The TFR declined by 5.9 percent a year during 1965-70 in Singapore, and by 5.4 percent a year during the same period in Hong Kong. These are small populations, however, compared to that of Kerala. In the Republic of Korea, which is larger than Kerala and has a strong family planning program, the rate of decline was 2.5 percent a year during 1965-76. In Sri Lanka the corresponding rate was 3.0 percent a year during 1965-74, and in Taiwan, China it was 2.8 percent a year during 1965-78. Thus, a reduction of the TFR by 4.7 percent a year for a large population like Kerala's is not unprecedented, but nevertheless noteworthy.

Fertility in Kerala fell fairly uniformly during the period 1965-80; the decline was 22 percent during 1968-73 and 20 percent during 1973-78. Figure 4.2 gives a comparative picture of the fertility changes between 1965-70 and 1970-75, and between 1970-75 and 1975-80. On the whole, the decline was slightly greater during the first five-year period than during the second five-year period (1.3 children compared to 0.9 children). With the exception of women aged 30-34, all the age groups reflect this pattern, suggesting that the decline among older women due to family planning seems to have spread to the younger age groups in more recent years.

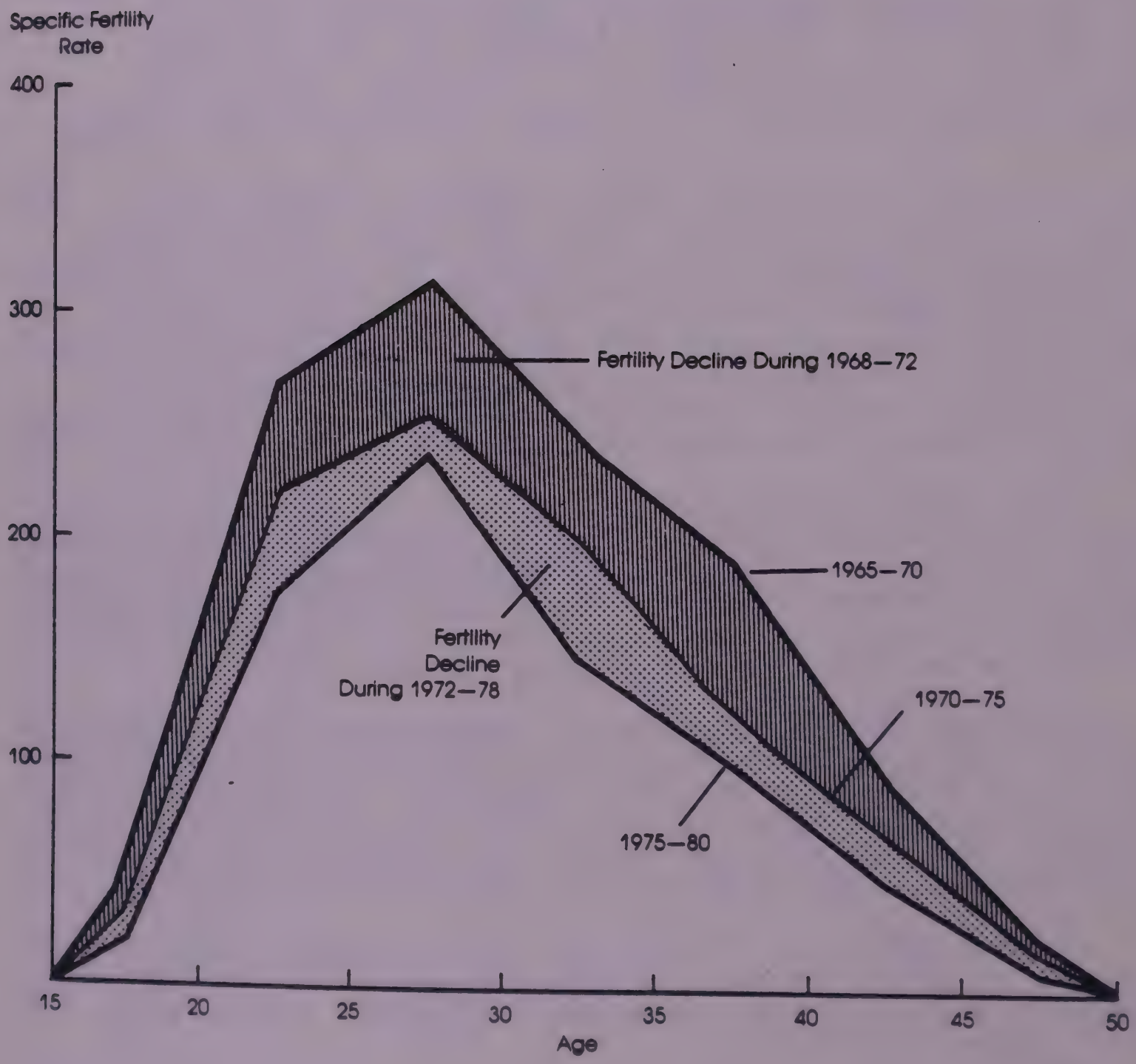
The fertility decline has not, however, been uniform across age groups in recent years; as Table 4.8 indicates, it was smallest in the 25-29 age group and largest in the youngest and oldest age groups. In the youngest age group, the decline was linked with the marriage factor to a great extent, and with family planning to a much lesser extent. In the older age groups, the decline was due almost entirely to family planning.

From the data collected, specific fertility rates can be calculated at five-year intervals from 1945-50 onward for ages 15-19 years, from 1950-55 onward for ages 20-24, and so on. These rates show a continuous decline in each age group from 1960-65 on (see Annex Table 5). The trend prior to 1960 is uncertain. The rates show some increase up to 1960-65, which may reflect the true situation, but could also be due to deficiencies in the data.

Between 1960-65 and 1975-80, the specific fertility rates declined by 65 percent at ages 15-19 years, 42 percent at ages 20-24 years, 26 percent at ages 25-29 years, and 44 percent at ages 30-34 years. The decline is the least at ages 25-29 years.

The marital fertility rates show much smaller decreases. At younger ages there is no decline at all; there are even some observed increases, which could be statistical aberrations. At older ages, age-specific fertility rates and age-specific marital fertility rates behave in a similar manner. One special point to note is that the rates for 1960-65 and 1965-70 are practically the same in all the age groups for which they are available. It would seem accurate to conclude that before 1960 there was little decline in marital fertility.

Figure 4.2
Period Specific Fertility Rates, 3 Districts of Kerala, 1965—70, 1970—75, and 1975—80



World Bank—25022

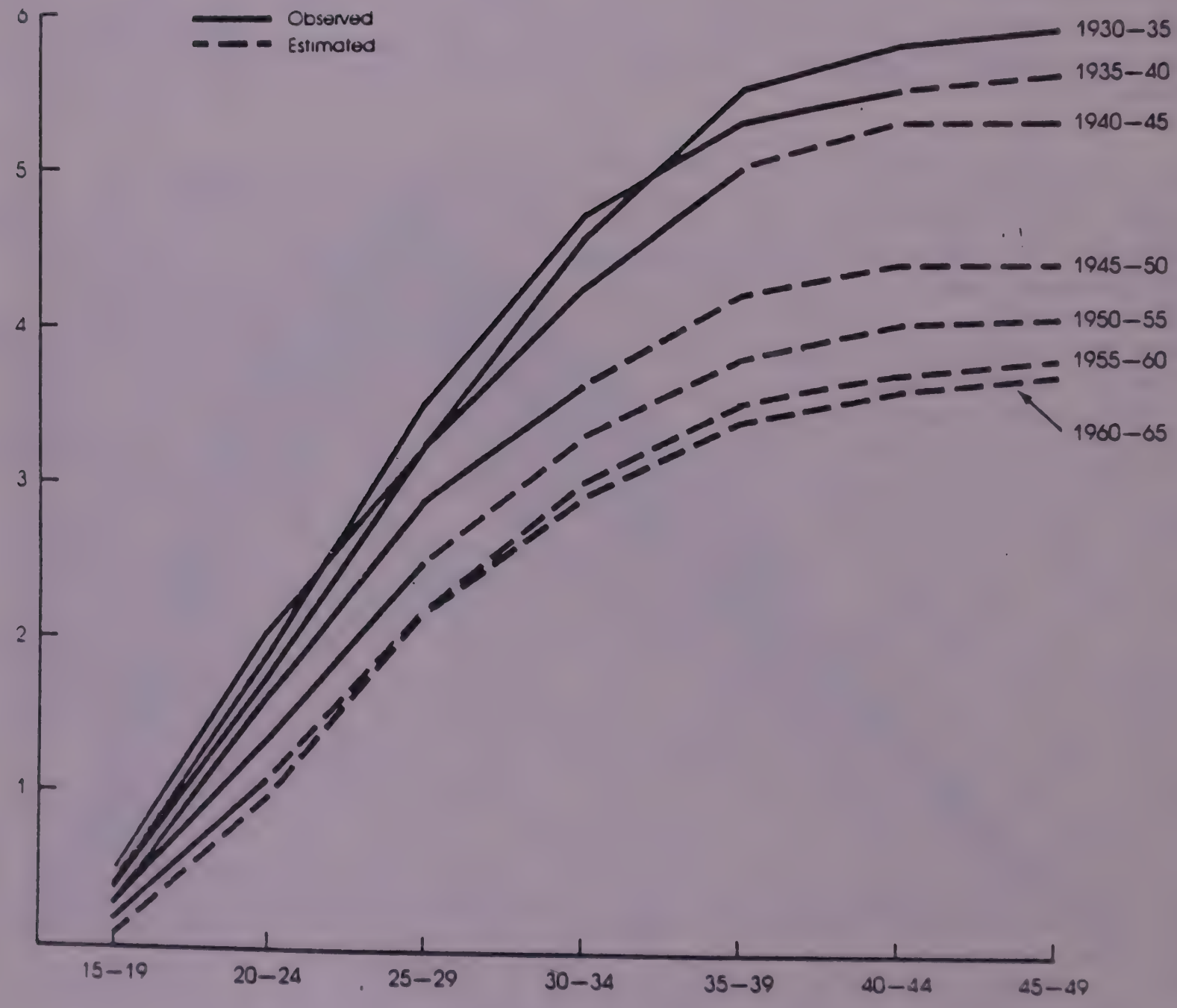
Cohort Fertility

Fertility rates for all cohorts are shown in Figure 4.3. A word of caution is necessary in interpreting these rates. Cohort fertility is complete only when women have passed through the entire childbearing period. In our sample, only one cohort has completed the childbearing period, the cohort born in 1930-35. For all other cohorts, the evidence is incomplete.

At one extreme is the group of women born during 1960-65, those who were 15-19 years old at the time of the survey. Their fertility experience is measured for a maximum of five years and most of their reproductive period is still ahead of them. We have assumed that the period fertility rate of women during 1975-80 will apply without change to all women who have not completed their fertility period. This assumption clearly overestimates the fertility rates of recent cohorts (as future fertility is likely to be lower) and thus underestimates the fertility differences between older and younger women.

Nevertheless, a few firm conclusions emerge from Figure 4.3. First, completed fertility has decreased consistently with a later year of birth. It is highest for those born in 1930-35 and lowest for those born in 1960-65. (No doubt the actual differences between the various cohorts are even greater than the figure indicates.) Second, there is a substantial difference between the fertility performance of women born before 1945-50 and those born after that period. The year of Indian Independence (1947) seems to be the great divide. Fertility decline in Kerala started with the cohort of women born around the year of Independence. The decline was not, however, confined to these women. Those born earlier were also affected by the trend and contributed to the fertility decline when the 1945-50 birth cohort reached reproductive age (that is, after 1960). Third, the year of marriage, rather than the year of birth, could be more relevant in fertility trends. For example, in 1960-65 those who were born in 1945-50 would have been 15-19 years old -- the age at which most women got married at that time. These are the years when land reforms were implemented, and when large-scale family planning efforts were initiated. Hence, those women who married in 1960-65 belong to the first marriage cohort affected from the very beginning of their married life by the vastly expanded family planning programs and by the social changes accompanying land reform as well as other legislative reforms. Therefore, fertility rates of this cohort and those following it are different from those of previous cohorts. Finally, the trend in incompleted fertility is not as systematic as the trend in completed fertility. Those women born in 1935-40 had higher fertility rates at ages 20-24 and 25-29 than those born in 1930-35. Similarly, those born in 1940-45 had higher fertility rates at ages 15-19 than those born in 1935-40 or 1930-35. Whether these trends are real or are mere statistical aberrations due to errors in the data or to the small sample size is uncertain.

Figure 4.3
Cumulative Cohort (Birth) Fertility Rates, 1930—35 to 1960—65



World Bank—25023

Fertility Differentials by Socioeconomic Group

One method of understanding the determinants of fertility changes in a population is to examine fertility differentials at a given point in time; another is to examine the trends in fertility differentials over a period of time. Both approaches are employed here. Fertility measures in this section are all for married women only. As the classification of the general population by socioeconomic group and marital status is not available, it is not possible to convert the marital fertility rates to rates for the total population.

Just as fertility decline has not been uniform across age groups, so it has not been uniform across socioeconomic groups. The principal objective of this section is to locate those groups which have high or low fertility rates, and those groups which have shown a more than average or less than average change in fertility rates in recent years. By linking these findings with data on family planning use by various groups, it should be possible to draw inferences about the determinants of fertility change in Kerala in recent years.

Age At Marriage

Those who marry early have more children, as shown in Table 4.9. On an average, women who married at age 23 or above have only two children compared with five for those who married below the age of 15. Part of this difference is due to compositional factors; those who marry early have a longer married life. The standardized average number of children varies from 3.8 for early marrying women to 2.6 for late marrying women, or a difference of only 1.2 children per woman.

Table 4.9 Average number of children ever-born by duration of and age at marriage, three districts combined, Kerala

Duration of marriage (years)	Age at marriage (years)						Sample row totals
	< 15	15-16	17-18	19-20	21-22	23+	
0-4	.63	.50	.63	.68	.71	.67	373
5-9	1.70	1.91	1.91	2.02	1.92	1.66	450
10-14	3.00	2.90	2.84	2.63	2.92	2.68	443
15-19	4.46	4.08	3.96	3.68	3.68	3.03	370
20-24	6.16	5.05	5.16	4.35	4.22	3.56	390
25+	5.99	5.73	5.41	5.35	4.76	3.44	653
All	5.02	4.27	3.59	2.92	2.61	2.04	2,679
Standardized	3.84	3.57	3.49	3.31	3.19	2.59	

WH 130
N54
04701
COMMUNITY HEALTH CELL
LIBRARY
AND
DOCUMENTATION

That there is a real difference in the fertility performance of women who marry early and those who marry late is very clear from the averages within each category of marital duration. For duration 0-4 years the variation is not systematic, but for longer durations consistent differences appear. Thus, for women married 15-19 years, the average number of children born decreases with increasing age at marriage: 4.5, 4.1, 4.0, 3.7, 3.7, and 3.0. The differentials become more systematic as duration increases.

From this table alone it is difficult to say whether a woman's age at marriage has determined her fertility, or whether a woman's fertility preference has helped decide her age at marriage. In the survey sample, there were only four respondents married less than five years. Those who married before the age of 15 were all older women, whereas those who married after the age of 23 were almost all younger women. There were only nine women who married after 23 years of age 25 or more years ago. These nine women must have been a highly selective group with respect to their fertility preference. Had they married younger, they may not have had more children than they actually produced.

Education

The average number of children ever-born is lower for the better educated than for the illiterate (2.1 for women with ten or more years of school and 4.5 for women with no schooling; see Table 4.10). Part of the difference here too is due to compositional factors, such as duration of marriage. If the averages are standardized for marital duration, the difference decreases, from 2.4 children before standardization to 0.8 children after standardization.

Table 4.10 Average number of children ever-born by duration of marriage and education of mother, three districts combined, Kerala

Duration of marriage (years)	Years of schooling				Sample row totals
	None	1-4	5-9	10+	
0-4	.53	.63	.67	.71	373
5-9	1.80	2.01	1.93	1.64	450
10-14	2.87	2.80	2.90	2.53	443
15-19	4.00	4.09	3.82	2.83	370
20-24	5.41	4.85	4.57	3.67	390
25+	5.83	5.71	5.12	4.40	653
All	4.49	3.80	2.94	2.13	2,679
Standardized	3.61	3.55	3.34	2.80	

The average completed fertility (number of children ever-born to women married 25 years or more) of the highly educated is 1.4 children less per woman than for their counterparts with no schooling (4.4 and 5.8, respectively). The decrease in the average number of children with increasing education of the woman is very systematic in our sample.

Much of the variation in fertility levels by educational attainment is due to differentials in age at marriage, as Annex Table 6 indicates, but real differences in fertility do exist between women of different educational groups, even when allowance is made for the variance in age at marriage. Fertility rates by educational attainment for recent periods are summarized in Table 4.11 and given in greater detail in Annex Table 7.

Table 4.11 Marital fertility rates by education, three districts combined, Kerala

Period	Years of schooling			
	None	1-4	5-9	10+
1965-70	6.2	6.7	6.3	5.0
1970-75	5.4	5.1	4.6	5.7 a/
1975-80	4.8	4.4	4.7	4.1
	Percent decline			
1968-73	13	24	27	-14
1973-78	11	14	-2	28
1968-78	23	34	25	18

a. This estimate is out of line with the other figures and inconsistent with the family planning data.

There are significant differentials and trends in these data, and not all are according to expectation.[4/] The overall pattern is that fertility has fallen among women of all educational levels, but the greatest

---

4/ Estimation of the total fertility rate for five-year periods from fertility history data is subject to considerable error. The rate is affected by transfers of birth and/or by the method of calculating the number of married women in each five-year period. Errors due to transfers of birthsare likely to be small in Kerala for the period 1965-79; the results of the post-enumeration survey (PES) showed that dates of birth were accurately reported. But the PES showed that the date of marriage was subject to an error of one or two years in some cases, and therefore estimates of the number of married women in the 15-19 age group for past years are unreliable. We have tried to minimize this error by excluding women 15-19 years and 45-49 years from the calculation of the total marital fertility rate (TMFR) and designating this as TMFR´.

decline has taken place among those with 1-4 years of schooling and the smallest among the highly educated. There could be two main reasons for this. First, in the past fertility has been highest in the group with 1-4 years of schooling; therefore, the scope for decline among them was considerable. Second, as will be seen later, sterilization has been an important factor in fertility decline in Kerala, and the propensity to undergo sterilization has been greatest among those with 1-4 years of schooling.

Another important fact that emerges from Table 4.11 is that in 1965-70 fertility among illiterate women was lower than among women with either 1-4 or 5-9 years of schooling. It is possible that such a pattern existed in earlier periods as well. Normally for such groups, fertility rises before falling. But the trend shown here is clearly downward. This reflects the fact that the potential fertility increase in this group due to improvements in health and nutrition was avoided through other means such as the birth control program, and particularly through acceptance of sterilization. One might suggest that without an active family planning program featuring an incentive system, it is very unlikely that an increase in fertility among women who had never gone to school could have been avoided. The consistent downward trend in fertility among the Scheduled Castes and among the economically disadvantaged groups of the society, as discussed below, may well reflect a similar impact of the family planning program, made attractive to the poorer segments of the population through financial incentives.

The differentials in specific fertility rates by education have not been the same in all age groups (Annex Table 7). Below 30 years of age, fertility seems to rise with increased schooling, especially at low levels of education. Above 30 years of age, fertility declines systematically with an increase in schooling.

Caste and Religion [5]

Marriage customs vary considerably from caste to caste in Kerala. Similarly, living arrangements for the married couple vary by religious and caste group. The available data suggest that these differences may have a significant effect on the number of children born to a woman.

The average parity of the Muslim women surveyed was 4.1, while that of the Nairs was only 2.9, a difference of 1.2 children per woman. The completed fertility of these two groups differs by 2.5 children. Between Nairs and Latin Christians, the difference in completed fertility is 2.7 children (Table 4.12).

Standardization with respect to duration of marriage does not eliminate all the intercaste differences. Muslims have the highest standardized average number of children (4.2), and Nairs have the lowest (2.9).

---

[5] In general, when the term caste is used in this study, it is intended to refer to ethnicity based on both caste and religious affiliation.

Table 4.12 Average number of children ever-born by duration of marriage and caste, three districts combined, Kerala

Duration of marriage (years)	Caste						Sample row totals
	Scheduled Castes/ Tribes	Nairs	Ezawas	Syrian Christians	Latin Christians	Muslims	
0-4	.42	.73	.63	.86	.77	.51	373
5-9	1.76	1.64	1.99	2.03	2.20	2.12	450
10-14	2.69	2.67	2.71	2.89	2.88	3.44	443
15-19	4.18	3.00	3.85	3.97	4.09	4.53	370
20-24	5.13	4.39	4.31	4.93	5.47	6.35	390
25+	5.70	4.39	5.52	5.35	7.09	6.91	653
All	3.56	2.86	3.38	3.58	3.56	4.07	2,679
Standardized	3.47	2.94	3.37	3.51	4.04	4.23	

Intercaste differentials in incomplete fertility are not always consistent with the pattern of differentials of completed fertility. For example, in marriages of 10-14 years, Syrian Christians and Latin Christians have more or less the same average parity, but among older women (those married 25 years or more) their average parities differ by 1.7 children. A similar comparison holds between Nairs and the Scheduled Castes. Thus, the fertility trend has not been the same for all castes at all times: the differentials which existed in the past have undergone major change and new differentials have arisen. For example, in 1965-70 the Christians had the highest fertility rate, but the Muslims hold this position today (Annex Table 8).

Fertility differentials based on caste have narrowed somewhat in recent years as the caste groups that originally had a higher fertility rate have experienced larger fertility declines since 1965. All the caste groups have felt the impact of birth control practices, either sterilization or contraception, but some, such as the Ezawas, show a greater impact than others, such as the Nairs.

Per Capita Household Expenditures

Per capita household spending has a very consistent and systematic negative relation to fertility (Table 4.13). As monthly per capita household spending increases from Rs. 30 or less to Rs. 120 or more, the average number of children per woman decreases from 4.0 to 2.6. Among women married for at least 25 years, the average number of children decreases from 6.7 to 4.5 with increasing expenditures. Even with respect to incomplete fertility, the inverse relationship holds rather systematically.

Table 4.13 Average number of children ever-born by duration of marriage and per capita household expenditures, three districts combined, Kerala

Duration of marriage (years)	Monthly per capita expenditures				Sample row totals
	<Rs. 30	Rs. 30-59	Rs. 60-120	Rs. 120+	
0-4	.80	.63	.67	.63	373
5-9	1.80	1.99	1.91	1.49	450
10-14	3.00	3.07	2.73	2.11	443
15-19	4.42	4.22	3.64	2.61	370
20-24	6.07	5.46	4.40	3.17	390
25+	6.67	6.23	5.27	4.46	653
All	4.03	3.77	3.34	2.62	2,679
Standardized	4.03	3.83	3.29	2.60	

The inverse relationship between fertility and per capita household expenditure seems to be quite robust, as is shown by both cohort and period fertility measures (Annex Tables 9 and 10). Marital fertility rates declined systematically with per capita household expenditure for each age group and for each five-year period from 1965 to 1980. (The only exception was women 20-29 years in 1965-70.) Within the same expenditure group, fertility has declined over time.

As is the case with respect to other characteristics, the overall decline has been largest in the intermediate group, that is in households that fall in the Rs. 60-120 range. Fertility decline in this group has been nearly twice that of adjoining groups. The extent of fertility decline has been greater in the older age groups (above 30) than in the younger age groups (below 30). Among women 30-44 in the per capita expenditure group Rs. 60-120, fertility declined by 67 percent during the ten-year period 1968-78.

Landownership

Ownership of land is another economic indicator with which fertility in Kerala shows a fairly consistent relationship. Table 4.14 classifies children ever-born by duration of marriage and ownership of land.

Table 4.14 Average number of children ever-born by duration of marriage and land owned, three districts combined, Kerala

Duration of marriage (years)	Land owned (cents) [a/]					Sample row totals
	0-5	6-10	11-49	50-99	100+	
0-4	.64	.60	.65	.63	.73	373
5-9	1.81	2.06	1.85	2.03	1.80	450
10-14	2.77	3.00	2.81	2.54	2.84	443
15-19	4.00	4.10	3.95	3.67	3.66	370
20-24	5.10	4.90	5.06	4.29	4.78	390
25+	5.69	5.94	5.55	5.38	5.46	653
All	3.70	3.50	3.51	3.21	3.44	2,679
Standardized	3.53	3.65	3.50	3.29	3.41	

a. One cent equals 1/100th of an acre.

In general, the less land a household has, the higher is the average number of children per woman in the household; but the differences are not large. The unstandardized average has a range of variation of 0.5 children, while the standardized average has a range of only 0.24 children. Completed fertility also varies little from one landownership group to another; the extremes differ by only 0.56 children. The pattern is somewhat consistent, however. Households with 6-10 cents of land have the highest fertility and those with 50-99 cents have the lowest. The highest fertility is not observed in the lowest ownership class, nor the lowest fertility in the highest ownership class.

Differentials and trends by ownership are presented in greater detail in Annex Table 11. In 1965-70, the marital fertility rate declined consistently with an increase in land owned by the household, from 6.74 to 6.12. This pattern did not hold in 1975-80, when the highest fertility was observed in the highest ownership group and the lowest fertility was observed in an intermediate group (11-49 cents).

Thus, fertility trends have not been uniform among the various landownership groups. On the whole, however, there is an inverse relation between land owned and percent decline in fertility. In the lowest group, fertility declined by 31 percent from 1968-78, while in the highest group the decline was only 22 percent.

Fertility Differentials by Family Planning Status

Women using a conventional family planning method have a much higher fertility than those who do not use any contraceptive. The total marital fertility rate for ages 20-44 (TMFR') for practicing contraceptors was 5.5 in 1975-80 compared with 4.9 for noncontraceptors. (This calculation excludes sterilized women, who are not included in either group.) The difference between the groups was 0.3 children per woman in 1965-70, which increased to 0.7 in 1970-75 and then decreased slightly to 0.6 in 1975-80 (Table 4.15).

High fertility seems to have induced women to use family planning, and this has led to a reduction in fertility. Some small narrowing of the differentials in 1975-80 and a slightly higher rate of fertility decline among family planning users for that period may be cited as evidence of the impact of conventional family planning on the fertility trend. Since the date of adoption of family planning by the women is not known, it is difficult to give a more precise evaluation of the effect, but on the whole it appears marginal.

As in the case of women who adopted a conventional family planning method, sterilized women have higher fertility than nonsterilized women. In fact, it appears that women accept sterilization because they have too many children.

In 1965-70 the TMFR' for sterilized women was 7.5, compared to 5.9 for nonsterilized women (Table 4.16). The difference is 1.6 children per woman. In 1975-80 sterilized women continued to have higher fertility (4.7 compared with 4.2 for the nonsterilized), but the difference between the two groups had narrowed to 0.5 children per woman. In 1970-75 the differential was even smaller (0.4). Thus, it appears that high fertility induced women to accept sterilization and, as a consequence, the fertility differentials between them and the nonsterilized women were reduced considerably.

Although the TMFR' was higher among the sterilized in every five-year period, their fertility rates at ages 30 and above were not higher in 1970-75 or in 1975-80. In each of these periods, however, sterilized women have had higher fertility at ages below 30 years (Table 4.17). In 1965-70, even at older ages (above 30 years) sterilized women had higher rates than nonsterilized women. After 1970 the reverse was true--sterilized women had significantly lower fertility rates, by as much as 0.9 children in 1975-80. Thus, although sterilization had been selective of high fertility women, it has, over time, resulted in a reduction of about one child per woman. From 1965-70 to 1975-80, fertility decline among the sterilized was much higher (37.8 percent) than among either the nonsterilized (29.5 percent) or the family planning practitioners (9.0 percent).

Table 4.15 Marital fertility rates by age and family planning status, three districts combined, Kerala

Age	Conventional family planning status	
	Noncontraceptors	Contraceptors
	1965-70	
20-24	342	333
25-29	314	330
30-34	222	282
35-39	188	173
40-44	(79)	(82)
TMFR′	5.725	6.000
	1970-75	
20-24	280	305
25-29	286	341
30-34	210	237
35-39	130	147
40-44	73	82
TMFR′	4.895	5.560
	1975-80	
20-24	294	418
25-29	270	321
30-34	205	176
35-39	143	120
40-44	60	57
TMFR′	4.860	5.460

Note: TMFR′ - total marital fertility rate for ages 20-44 years.

Table 4.16 Marital fertility rates by age and sterilization status, three districts combined, Kerala

Age	Nonsterilized	Sterilized
	1965-70	
20-24	340	416
25-29	319	384
30-34	238	289
35-39	185	248
40-44	103	157
TMFR´	5.925	7.470
	1970-75	
20-24	287	419
25-29	302	281
30-34	219	207
35-39	134	112
40-44	75	71
TMFR´	5.085	5.450
	1975-80	
20-24	160	457
25-29	285	269
30-34	196	116
35-39	136	60
40-44	59	28
TMFR´	4.180	4.650

Note: TMFR´ - total marital fertility rate for ages 20-44 years.

Table 4.17 Marital fertility rates by sterilization status, broad age groups, three districts combined, Kerala

Age	Nonsterilized	Sterilized
20-29 years		
1965-70	3.295	4.000
1970-75	2.945	3.500
1975-80	2.225	3.630
30-44 years		
1965-70	2.630	3.470
1970-75	2.140	1.950
1975-80	1.955	1.029

Factors Related to Fertility: Regression Analyses

In the previous sections of this chapter, differentials in fertility levels and trends were estimated based on cumulative as well as period-specific fertility rates. The analyses indicated which socioeconomic groups had higher or lower fertility levels, as well as which groups did or did not experience fertility declines, thereby yielding considerable insight regarding the factors underlying fertility differentials and trends. In this section, the same question is approached through multivariate analysis.

Several measures of fertility have been used, beginning with cumulative fertility or children ever-born (parity). We also reviewed two period measures: the number of births per woman during five-year and ten-year periods. Current fertility was determined by the number of births during the last twelve months before the survey. The last measure used was the open birth interval (period between births), which is inversely related to fertility levels and directly related to the degree of fertility control.

Along with each of the nine dependent variables, ten independent variables were used. Two are demographic control variables: age and age at marriage. The third is a family planning variable (1 = sterilized or using a conventional family planning method, 0 = otherwise). There is one cultural variable, caste (1 = Nair or Syrian Christian, 0 = others) 6/ and one socioeconomic variable, years of schooling (0,1,2,...) of the woman. The five other variables are indicators of the family's economic condition. These are:

- per capita household expenditures
- land owned by the household
- roofing material (1 = tile, asbestos, tin, concrete; 0 = all other materials)

6/ Caste is also analyzed two at a time, with the Scheduled Castes as the standard in all comparisons.

- source of water supply (1 = pipe; 0 = all others)
- toilet facilities (1 = flush; 2 = ESP slab; 3 = bucket; 4 = pit; 5 = compound).

All ten independent variables had a statistically significant relationship with parity (regression I; see Table 4.18). The total explained variance (R^2) is 51 percent, of which 40 percent is due to age. Of the remaining 11 percent, 8 percent is contributed by age at marriage, 0.8 percent by years of schooling, 0.6 percent by caste, and 0.4 percent by family planning.

Age at marriage had a negative relationship with parity; the regression coefficient is -0.013. An increase of one year in age at marriage decreases the parity by 0.16. Years of schooling also had a negative coefficient (-0.0753); an increase of five years in length of schooling reduces the parity by 0.38. Caste is negatively related. Nairs and Syrian Christians had significantly lower parity than all others taken together. The economic variables, such as per capita household expenditures, land owned, roofing material, and source of water supply, had positive relationships. Other things being equal, those who were "better off" had more children than those who were economically disadvantaged. Family planning status also had a positive relationship. Those who were sterilized or used conventional family planning had more children than others.

If we take the number of surviving children as a measure of fertility (regression II), the relationship does not change much. The R^2 decreases from 51 to 45 percent, of which 35 percent is due to the age factor. All the factors remain statistically significant and keep the same sign.

We next considered the number of children born in a specific period of time (regressions III-VII). A few relationships appear consistently in all these regressions. One is that caste and education are negatively related to fertility. Another is that age at marriage is positively related to period fertility but negatively related to cumulative fertility.

Cumulative fertility was positively related to age, as it should be, but period fertility was either negatively related or not significantly related at all. For births in a ten-year period, there was a significant negative relationship; for births in a five-year period, the negative relationship was statistically significant only for the period 1975-80. For the same period, age was significant at the second degree level in the positive direction.

Age at marriage was negatively related to cumulative fertility measures, but positively related (very consistently in all five regressions) to period fertility. Women who married late had more children born during a fixed five-year or ten-year period. For example, for the 1975-80 period the regression coefficient is + 0.00173. An increase of ten years in the age at marriage was associated with an increase of 0.2 children born in that period, a very small difference indeed for a very large difference in age at marriage.

Table 4.18 Summary of regression analyses of fertility measures

Independent variable	Regression number								
	I	II	III	IV	V	VI	VII	VIII	IX
Age	+	+	-	-	0	0	-	-	+
$(Age)^2$					0	0	+		
Age at marriage	-	-	+	+	+	+	+		-
Family planning	+	+	+	-	+	0	-	-	0
Caste	-	-	-	-	-	-	-	0	0
Household expenditures	+	+	0	0	0	0	0	0	0
Land owned	+	+	+	0	0	0	0	0	0
Years of schooling	-	-	-	-	-	0	-	-	+
Roofing material	+	+	0	+	0	+	0	0	0
Source of water	+	+	0	0	0	0	0	0	0
Toilet facility	+	+	+	+	+	+	0	0	-
R^2	0.509	0.452	0.192	0.269	0.124	0.217	0.292	0.145	0.470

Notes: + positive significant relationship
- negative significant relationship
0 no significant relationship

Blank space indicates that the variable was not included in the regression.

Dependent variables in regressions I to IX:

I: Children ever-born
II: Surviving children
III: Number of births during 1965-75
IV: Number of births during 1970-80
V: Number of births during 1965-70
VI: Number of births during 1970-75
VII: Number of births during 1975-80
VIII: Number of births in 1979
IX: Open birth interval

Years of schooling were negatively related in all regressions, and in all but one they had a statistically significant association. In general, the value of the regression coefficient declined with time, suggesting that the degree of association between education and fertility grew weaker:

Period	Regression coefficient	B-coefficient	F-value
1965-75	-0.0496	-0.1022	9.053
1970-80	-0.0312	-0.0734	6.847
1965-70	-0.0334	-0.1040	8.623
1970-75	-0.0077	-0.0268	0.830
1975-80	-0.0139	-0.0575	5.203

An increase of five years in schooling was associated with a decrease of 0.25 children born during 1965-75, but of only 0.16 children born during 1970-80. The corresponding changes from 1965-70 to 1975-80 were from 0.167 to 0.069 children. Thus, education seemed to have lost some of its power in determining a woman's fertility level.

Caste had an independent impact on fertility. The regression coefficient was negative and statistically significant in every regression. Nairs and Syrian Christians had lower fertility than all the other castes put together. In this case, as in the case of education, the value of the regression coefficient fell gradually:

Period	Regression coefficient
1965-75	-0.2250
1970-80	-0.1756
1965-70	-0.1309
1970-75	-0.1215
1975-80	-0.0915

The economic variables had, on the whole, small statistically significant relationships with the dependent variables. Per capita household expenditures were positively related to parity, but the statistical significance disappeared when period-specific fertility was considered. Nor were household expenditures significantly related to the open interval variable. A somewhat similar picture emerged with respect to land owned by the household: the amount of land was positively related to parity, but had no significant relationship with any of the period-specific fertility measures. The same was true with respect to roofing material and source of water supply.

The type of toilet facility, on the other hand, did show some significant relationship with fertility. Table 4.18 indicates that the relationship was positive, but the facilities were inversely ranked: flush had rank 1, ESP slab 2, bucket system 3, pit 4, and compound 5. Thus, poorer facilities were associated with higher fertility. The relationship was in reality negative.

The relationship of the family planning variable (1 = sterilized or using a contraceptive, 0 = all others) to fertility was positive in some regressions, but negative in others. We have mentioned that family planning is positively related to cumulative fertility. Those who have large families get sterilized or use contraceptives. The relationship is positive with respect to period fertility for 1965-75 and for 1965-70. It becomes negative for 1970-80 and for 1975-80, and nonsignificant (but positive) for 1970-75. The coefficients are:

Period	Regression coefficient
1965-75	+0.1976
1970-80	-0.1441
1965-70	+0.2244
1970-75	+0.0290
1975-80	-0.1058

Adopters of family planning were a group selective of high fertility. But once they adopted family planning, their fertility for subsequent periods was significantly lower than that of nonadopters. Family planning, especially sterilization, appears to have contributed to a fertility decline in Kerala in recent years.

For the births in 1975-80, the ten independent variables together explained at most about 29 percent of the total variance, with 26 percent explained by age. Thus, the variance attributable to socioeconomic factors was relatively small. The percentage of the total variance (29.2 percent) explained by each is:

Age	90.5
Family planning	2.2
Toilet facility	1.9
Age at marriage	1.8
$(\text{Age})^2$	1.5
Caste	1.4
Education	0.6
Others	0.1

Two other regressions were included in our analysis. One of them, on births during the twelve months preceding the survey, indicated a significant negative relationship with age, with education, and with family planning. None of the socioeconomic variables other than education had statistically significant relationships. The last regression was on the open birth interval, which was positively related to age and years of schooling and negatively related to age at marriage and toilet facilities. These regressions do not add much to the understanding of the factors underlying fertility, except that they afford additional evidence of the relatively insignificant part which socioeconomic variables play in explaining fertility differences among women in Kerala.

The main conclusion that emerges from the summary of all nine regressions in Table 4.18 is that, apart from demographic variables such as age and age at marriage, the principal variables which had a statistically significant impact on fertility were family planning, educational attainment, and caste.[7]/ The relation of fertility to family planning is understandable, especially because a large proportion of the "family planning" couples are actually sterilized (wife or husband). The relation to education is in the expected negative direction, and it remained statistically significant even after controlling for age at marriage and family planning -- two variables through which education generally operates on fertility. The years of schooling of the woman had an independent effect on fertility. It is possible that better educated women used family planning more efficiently than less educated women, or that they had been practicing family planning for longer periods of time. An alternative explanation may involve differences in the amount of time couples actually live together. Educated women usually have educated husbands, who are likely to work away from home for longer periods than less educated husbands.

The factors underlying the negative relationship between fertility and caste are obscure. The total variance accounted for by the regression was less than 30 percent, leaving about 70 percent still to be explained. Some of the factors involved are certainly cultural ones affecting marriage, abstinence, childbirth, cohabitation after childbirth, breast-feeding, and so on, many of which are religion- and caste-related. It is no wonder, therefore, that fertility varies by caste and by religious group. A detailed explanation of the differentials would require an analysis of the practices associated with marriage and child rearing specific to each group.

7/ Detailed analysis of the caste variable indicated that it was only the Nair caste which had a significantly lower fertility than the Scheduled Castes, while only Muslims had a significantly higher fertility.

Chapter 5. Desire for Children

The reproductive period of a woman in a traditional society extends typically from marriage to menopause, during which time a couple's fertility plans and decisions are made. Two contrasting views are often posited about the nature of these fertility decisions. The first, called the single decision model, assumes that the demand for children is fixed at the start of marriage; the later stages of reproductive life are relevant only with regard to how well the initial decision is carried out. The second view, called the sequential decisionmaking model, assumes that a rough decision about desired family size is made early in a marriage, but that the desired family size is recalculated periodically, with each achieved birth affecting the demand for subsequent births. From the former perspective, fertility goals are represented by the desired number of children, whereas from the latter perspective, they are represented by the desire for an additional child. This chapter is devoted to an analysis of each of these two measures of fertility preference, and of the unmet demand for family planning that can be derived from these measures.

The fertility survey used several attitude questions to generate data pertaining to both desired number of children (also referred to here as desired family size) and desire for an additional child. The responses to these questions yielded the results summarized below.

On desired number of children:

- The average desired number of children in Kerala was 3.25. This is slightly less than the average parity (3.48), slightly more than the average number of surviving children (3.02), and less than the estimated total fertility rate for 1975-79 (3.7).

- The desired number of children was determined mostly by the number of children ever-born, increasing by 0.44 with every unit increase in parity.

- 32 percent of the women surveyed had more children ever-born than they desired (excess fertility women), and 17 percent had more surviving children than they desired (excess net fertility women).

- Excess fertility women were more likely to be sterilized than deficit fertility women. But not all excess (net or gross) fertility women practiced contraception or were sterilized. About 46 percent of the excess fertility women and 40 percent of the par fertility women (parity = desired number) were neither sterilized nor using a family planning method. Similarly, 37 percent of the excess net fertility women and 41 percent of the par net fertility women were not taking any steps to prevent pregnancy.

- The principal factors associated with the practice of birth control by excess fertility women are family size and education (both positively related).

On desire for an additional child:

- 27 percent of the currently married women reported that they did not want an additional child. The principal determinants of wanting an additional child are age, number of surviving children, number of surviving sons, and education (all negatively related), age at marriage (positively related), and caste.

- Nearly half of the nonsterilized women who did not want an additional child were not using any form of contraception. The principal determinants of contraceptive practice by such women were education, age, and household economic status (all positively related) and caste.

On unmet demand for family planning:

- Unmet demand for family planning services was estimated at 13 to 18 percent of the currently married women (13 if the definition is based on desire for additional children, 18 if it is based on desired number of children). For Kerala as a whole, this implies an unmet demand among between 500,000 and 650,000 women.

- The incidence of unmet demand (using the conservative definition) was largest among the 35-39 age group (21 percent), women with five or more surviving children (22 percent), Muslims (22 percent), and illiterates (24 percent).

- The principal reason why women with unmet demand were not using any form of contraception was that either they or their husbands disapproved of family planning. It is necessary to find out whether this dislike is directed specifically against sterilization, which was the principal method offered in the 1970s. Very probably, these couples can be motivated to adopt family planning if suitable alternate methods are offered.

Desired Number of Children

The analysis of the desired number of children, especially in conjunction with the actual number of children, provides a measure of the prevalence of "undesired" children (or excess fertility) in the society, a measure of the prevalence of women with excess fertility (more children than desired), and a measure of the utilization of birth control methods by women who have completed their desired family size. This information, especially coupled with the data on desire for another child, leads to additional insights regarding the determinants of fertility and family planning usage in Kerala.

Distribution

All ever-married women in the sample were asked:

"If you could choose exactly the number of children to have in your whole life, how many children would that be?"

The distribution of ever-married women by their desired number of children is given in Table 5.1. The desired number clusters around 2 and 3, with about two-thirds of the women preferring either of these numbers. The mode is 3, which is the desired number of 37 percent of the women; the mean is 3.25, and the median is 2.47.

5.04 Some interdistrict variation in the distribution of the desired number of children occurred. The proportion of women who prefer three children is practically the same in all districts; however, the proportion who prefer two varies considerably (36.5 percent in Ernakulam, but only 21.6 percent in Palghat).

Table 5.1 Distribution of women by desired number of children, three districts combined, Kerala

Desired number of children	Number of women	Percentage of women
0	4	0.1
1	56	2.1
2	826	30.7
3	984	36.5
4	384	14.3
5	209	7.8
6	116	4.3
7	46	1.7
8+	51	1.9
Unknown	18	0.6

Differentials

The desired number of children varies considerably with the demographic characteristics of the woman, and also with certain socioeconomic variables. A few of these differentials are discussed below.

Parity. Parity has the highest correlation with the desired number of children. Table 5.2 gives the average desired family size by parity for the three districts separately and combined. In all the districts, the desired family size increases with parity. The difference among the averages for each district is not large (3.54 in Palghat and 3.07 in Ernakulam), but it is fairly consistent at all parities. Between parities 1 and 7, the increase in desired family size is 2.62 and the increase in parity is 6.0. On an average, an increase of one child ever-born results in an increase of 0.44 in the desired number of children. Thus, of every 100 "undesired" children born, 44 become "desired" over the course of time.

An exception to the pattern of parity and desired family size increasing together is the case of zero-parity women. The average number of children desired by such women is slightly higher than for one-parity women. Thus, women yet to bear their first child desired more children than those who already had their first child. The experience of the first birth seems to diminish the desire for additional children.

Table 5.2 Average desired number of children by number of children ever-born (parity), Kerala

Parity	Palghat	Ernakulam	Alleppey	Three districts combined	Sri Lanka
0	2.82	2.03	2.35	2.44	2.50
1	2.63	2.17	2.03	2.29	2.30
2	2.58	2.34	2.28	2.38	2.65
3	3.06	2.91	2.96	2.97	3.30
4	3.59	3.35	3.32	3.42	3.94
5	4.01	3.94	3.82	3.92	4.65
6	4.34	4.36	4.45	4.38	5.22
7	5.09	4.80	4.68	4.89	5.64
8+	5.63	4.86	5.44	5.35	6.63
All parities	3.54	3.07	3.15	3.25	3.75

Note: The average desired number of children in a few other countries is given below (World Fertility Survey data):

Republic of Korea	3.2	Pakistan	4.2
Thailand	3.7	Fiji	4.2
Nepal	4.0	Malaysia	4.4
Colombia	4.1	Dominican Republic	4.8

Age. As age and parity are highly correlated, the relationship between desired family size and age is similar to that between desired family size and parity. The average desired family size increases from 2.72 at ages 15-19 to 3.97 at ages 45-49 (Table 5.3). The increase is consistent from one age group to another, and the interdistrict differentials are also consistent at all ages. One peculiar feature of these data is that the desired family size of women aged 20-24 is lower than that of their counterparts aged 15-19. This is similar to the "reverse pattern" observed in the data for zero-parity women.

Table 5.3 Average desired number of children by age of woman, Kerala

Age	Palghat	Ernakulam	Alleppey	Three districts combined
15-19	2.96	2.32	2.38	2.72
20-24	2.94	2.47	2.38	2.60
25-29	3.05	2.49	2.66	2.73
30-34	3.29	2.87	2.83	3.00
35-39	3.91	3.32	3.46	3.55
40-44	4.21	3.75	3.62	3.84
45-49	4.18	4.03	3.76	3.97
All ages	3.54	3.07	3.15	3.25

Other characteristics. Finally, Table 5.4 summarizes the variation in the average desired number of children by age at marriage, family planning practice, education, and ownership of land. Those women who marry late have a lower desired family size than those who marry early. Those who use conventional family planning methods have a lower desired number of children than those who are sterilized (or have sterilized husbands) or do not use any family planning method. Educated women desire fewer children than the less educated or illiterate. While the ownership of increasing amounts of land does not correlate with a marked difference in desired family size, there does seem to be a general tendency for women with less land to desire more children than do women with more land.

Table 5.4 Average desired number of children by selected characteristics of woman, three districts combined, Kerala

Age at marriage		Current family planning practice	
Under 15	4.07	Not practicing	3.35
15-16	3.59	Using conventional family planning methods	2.93
17-18	3.28	Sterilized	3.28
19-20	3.03		
21-22	2.89		
23+	2.48		
All women	3.25		
Education		**Landownership a/**	
No schooling	3.80	Less than 5 cents	3.32
1-4 years	3.39	Less than 10 cents	3.27
5-9 years	3.02	10-49 cents	3.25
10+ years	2.47	50-99 cents	3.15

a. One cent equals 1/100th of an acre.

Desired Family Size: Regression Analyses

Comparison of the average family size desired by various socioeconomic groups is affected by differences in the age-parity composition of the groups involved. Valid comparisons can be made only after standardizing the averages with respect to parity, age, or both. An alternate approach is the multiple regression method, summarized below, which makes it possible to measure the influence of one variable while keeping the other variables constant.

Among the variables included, seven had statistically significant relationships with the desired number of children: parity, age, age at marriage, family planning status, education, ownership of land, and per capita household expenditures (which, however, did not have a significant relationship in one of the regressions). Of these, parity had the highest explanatory power; the R^2 is 48.2 percent, of which 42.9 percent (or 89 percent of the total) is contributed by parity. With every unit increase or decrease in parity, the desired number of children increases or decreases by 0.446.

This relationship can be interpreted in at least two ways. First, desired family size is undergoing a downward trend. If this is true, since the average family size was higher in the past, average parity and average

desired family are positively related. Second, there is no trend in the average family size. The increase in desired number of children with an increase in parity is a change which takes place after the birth of an "undesired" child. When an additional birth takes place, whether desired or not before conception, it becomes desired in 44 out of 100 cases. In actual practice, both these processes may be operating: the desired family size has been declining, and also the birth of an undesired child in nearly half the cases changes the parents' expressed attitude about desired family size. The policy implications of these two interpretations may be very different since, according to the first, desired family size is determined more by socio-economic variables, while according to the second it is determined by parity.

The relation between the age of a woman and her desired family size is similar to that between parity and desired family size, but the regression coefficient is much smaller (R^2 = 0.242).

Age at marriage is negatively related to desired family size; it has a regression coefficient of -0.007, compared to 0.004 for age. Women who marry later have a lower desired family size irrespective of their age, parity, or education.

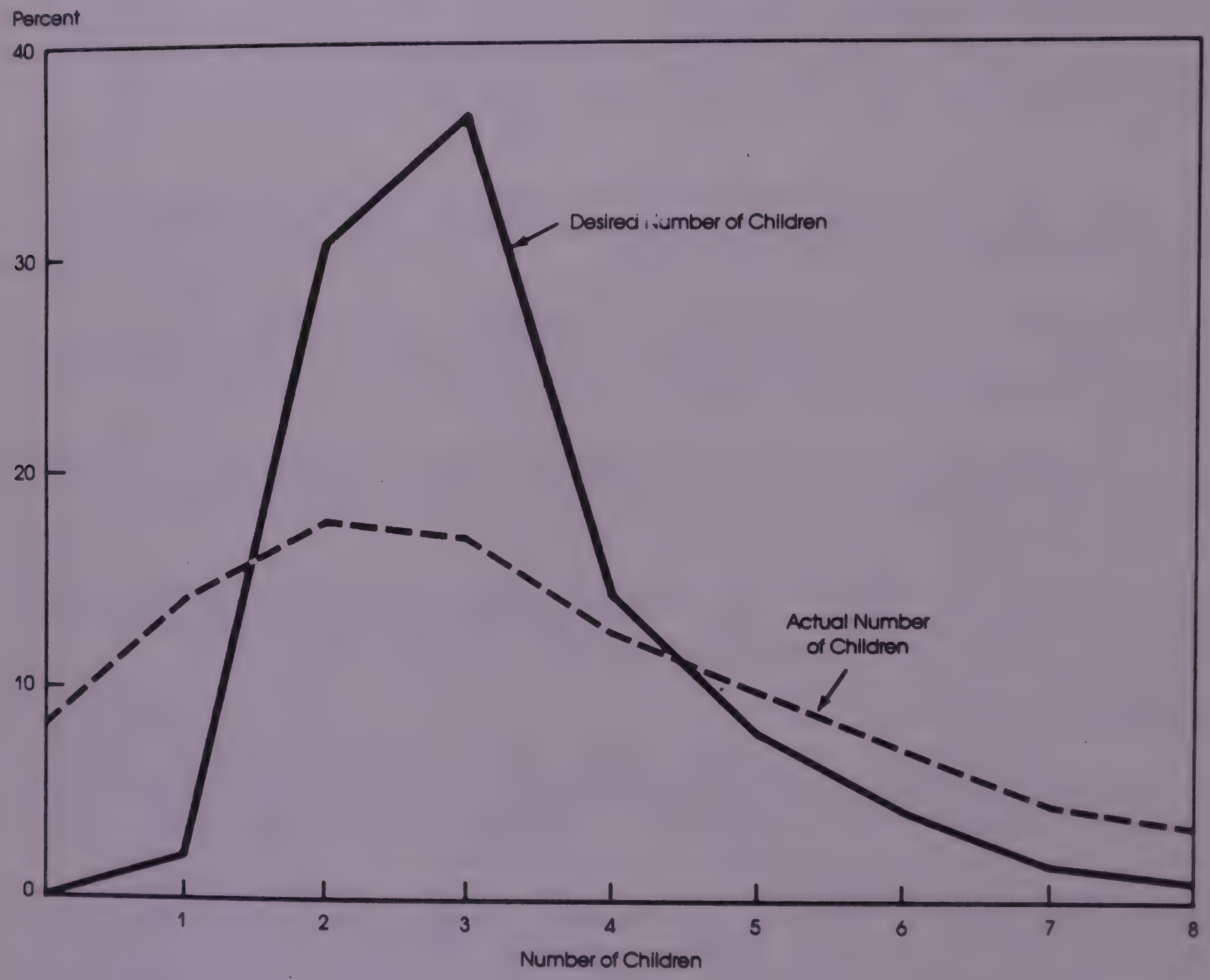
There is a strongly positive relation between desired family size and the number of children dead (R^2 = 0.133). For each death of a child, the mother's desired family size rises by 0.133.

Finally, education has a negative relation to desired family size, while landownership has a positive one. The regression coefficients are relatively small, however (-0.029 and +0.0007 respectively).

Excess Fertility

In comparison to the distribution of the desired number of children, the distribution of the actual number of children is much more dispersive (Figure 5.1). The mode of the distribution of actual number (parity) is also 2 or 3 (depending on district); but the percent of women with two or three children is only 35, compared with 67 percent for those desiring two or three children. The averages, however, are closer. The arithmetic average of desired number of children is 3.25, and of parity 3.48. Thus, an ever-married woman in Kerala has, on average, 0.23 children more than she desires. This average difference is, however, not a good measure of the excess fertility in the State. For one thing, the sample of women includes those ranging in age from 15 to 50, with marriages of widely differing duration. The average is therefore a balance between the "excess fertility" of older women and the "deficit fertility" of younger women rather than any true measure of excess fertility. Second, the average parity reflects not only present fertility rates, but also past fertility rates, while the average desired number of children is a reflection of current conditions. A better comparison would be between the average desired number of children and the cumulative fertility rate based on current fertility rates. Third, when asked about desired number of children, a woman's answer is likely to reflect the desired number of <u>surviving</u> children (net fertility,

Figure 5.1
Percent Distribution of Women by Desired Number of Children and Children Ever-Born, for the Three Districts, Kerala



World Bank—25025

not gross fertility). Therefore, to estimate "excess fertility," the comparison should be between desired family size and net fertility, that is, the number of surviving children.

The actual number of children ever-born (P) to a woman is either more, less, or equal to the desired number of children (D). On this basis women can be classified into 3 groups:

- excess fertility women, for whom P>D
- par fertility women, for whom P=D
- deficit fertility women, for whom P<D

The distribution of the sample of women by these categories is shown in Table 5.5. Of the women surveyed, 866 or nearly one-third of the total had more children born than they desired; they can be called excess fertility women.

Table 5.5 Percentage of women by fertility status and district, Kerala

Fertility status (P-D) a/	Palghat	Ernakulam	Alleppey	Total
Excess fertility	34	30	33	32
Par fertility	29	40	41	37
Deficit fertility	37	30	26	31
Total number of women	907	865	922	2,694

a. Children ever-born (P) - desired number of children (D) = fertility status.

As explained above, a more correct comparison regarding excess children is that between desired number of children (D) and surviving number of children (Ps). The difference (Ps-D) is called excess net fertility. As $Ps \leq P$, the number of women with excess net fertility is less than or equal to the number of women with excess fertility, and the number of undesired children alive is less than or equal to the number of undesired children ever-born. These comparison are given in Tables 5.6 and 5.7. The number of women with excess fertility is reduced by about 400 or nearly half, while the number of undesired children is reduced by 49 percent. However, the average number of undesired children per woman remains fairly constant. Those women who have excess fertility or excess net fertility each have about 2.2 undesired children.

Table 5.6 Distribution of women by gross and net fertility status, three districts combined, Kerala

Fertility Status	P-D a/	Ps-D b/	Difference
Excess fertility	866	459	-407
Par fertility	987	1,224	+237
Deficit fertility	841	1,011	+170
Total	2,694	2,694	-

a. Children ever-born (P) - desired number of children (D) = gross fertility status.

b. Surviving children (Ps) - desired number of children (D) = net fertility status.

Table 5.7 Distribution of women by number of undesired children, three districts Combined, Kerala

Number of undesired children	Children ever-born		Children surviving	
	Women	Children	Women	Children
1	364	364	153	153
2	233	466	140	280
3	120	360	74	222
4	68	272	42	168
5+	81	467	29	159
Total	866	1,929	438 a/	982
Average		2.23		2.24

a. For 21 women the number of undesired children is not known.

The incidence of excess fertility is fairly uniform in the three districts (Table 5.5), but it varies considerably by age, parity, and socioeconomic characteristics.

Parity. We have seen that the number of children a woman has is a major determinant of the number of children she desires. It is also a major determinant of her fertility status (excess, par, or deficit). Figure 5.2 shows the distribution of women by fertility status at each parity (gross) for the three districts combined.

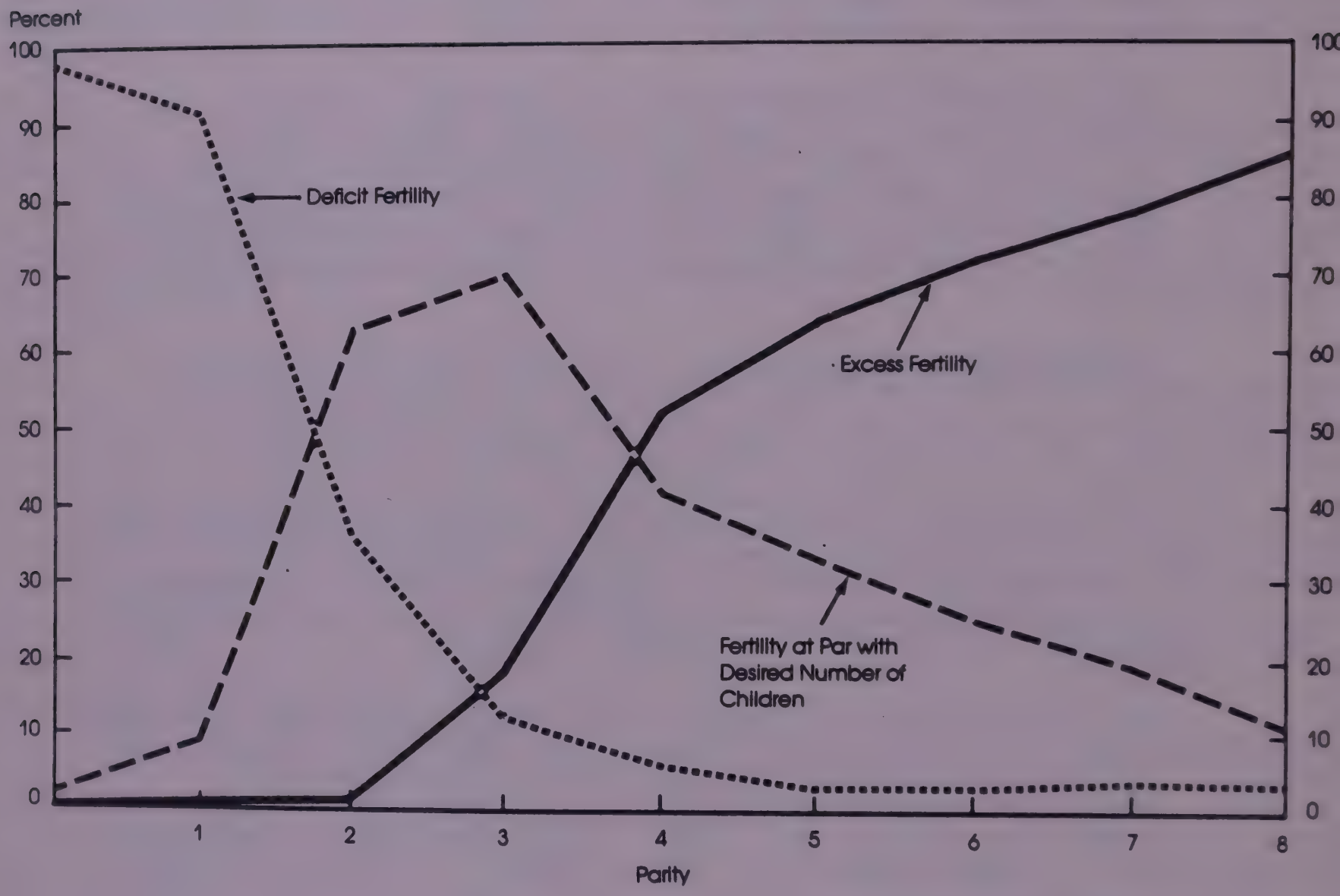
There are practically no excess fertility women among those who have two children or less. The proportion of excess fertility women increases very sharply at parity 3: between parities 3 and 4, it jumps 34 percent. The increase decelerates sharply at higher parities. Three-parity women are the best target for family planning education in the sense that they are likely to yield the maximum results by their acceptance of family planning methods.

Socioeconomic characteristics. A strong negative relationship exists between education and excess fertility. The proportion of excess fertility women decreases from 46 percent among women with no education to 15 percent among women with ten or more years of schooling (Table 5.8).

The relationship between ownership of land and excess fertility is also negative, but rather weak. Among women with little land, about 35 percent are excess fertility women. The proportion decreases only slightly (to 29 percent) when the ownership of land increases to one acre or more (Table 5.8).

The 866 excess fertility women in the sample survey have among them 1,929 undesired children, or an average of about 2.23 undesired children each (Table 5.7). There are 81 women who each had five or more undesired children. The 1,929 undesired children represent a fifth (20.8 percent) of all the children ever-born to these women. Their distribution by the parity of the mother is shown in Table 5.9. The proportion of undesired children increases very sharply with partiy, from about 6 percent at parity 3 to about 42 percent at parity 8+.

Figure 5.2
Distribution of Women by Difference Between Parity and Desired Number of Children by Parity, Kerala



World Bank—25026

Table 5.8 Percentage of excess fertility women by socioeconomic group, three districts combined, Kerala

Socioeconomic variable	Percentage of excess fertility women[a/]
Education	
No schooling	46
1-4 years of schooling	37
5-9 years of schooling	24
10+ years of schooling	15
All women	32
Landownership [b/]	
Less than 5 cents	35
Less than 10 cents	34
11-49 cents	34
50-99 cents	30
100+ cents	29

a. Based on gross fertility status, that is, on children ever-born as opposed to children surviving.

b. One cent equals 1/100th of an acre.

Table 5.9 Distribution of undesired children by parity of mother, three districts combined, Kerala

Parity	Number of undesired children (gross)	Total number of children	Percentage of children undesired (gross)	Number of undesired children per woman (gross)
1	0	377	0.0	-
2	6	946	0.6	0.01
3	85	1,371	6.2	0.19
4	223	1,368	16.3	0.65
5	313	1,400	22.4	1.12
6	336	1,230	27.3	1.64
7	272	903	30.1	2.11
8+	694	1,666	41.7	3.45
All parities	1,929	9,261	20.8	0.78 a/

Note: Gross here means that the figure does not take into account mothers who desire more children than they have.

a. Excluding women of zero parity but including all other (excess, par, and deficit fertility) women.

Excess Fertility: Regression Analyses

Two sets of regressions have been worked out, one using parity and other variables, and the other using age in place of parity. In addition, two sets of samples were used, one including excess and par fertility women and the other excluding par fertility women. The percent of variance explained is quite high on the whole, as much as 62 percent in the case of excess net fertility and 54 percent in the case of excess gross fertility, referred to hereafter simply as excess fertility. In both cases, the principal factor explaining the variance is parity, which accounts for 71 percent of the explained variance in the case of excess net fertility and 94 percent in the case of excess fertility. The second most important variable is the number of children dead. Not only are women with more children more likely to have excess fertility (0.44 for each additional parity, net or gross), but also women with one or more children dead are more likely to have excess fertility (0.31 gross and 0.51 net excess fertility for each child dead).

Education has a positive and statistically significant coefficient of 0.028, which implies that excess fertility (both gross and net) increases with educational attainment. This result is somewhat surprising in view of the trend in Table 5.8, where the proportion of women with excess fertility decreases sharply with education. But the two results need not be contradictory. Educated women report more excess fertility than uneducated

women. It may well be that educated women report their actual desired family size while illiterates tend to rationalize the number already born and thus minimize the extent of undesired children.

Ownership of land and per capita household expenditures are negatively related to excess fertility.[1/] As the amount of land owned by the household increases, and as per capita household expenditures increase, the incidence of excess fertility decreases.

Excess Fertility and Family Planning Use

One of the major interests in studying the data on desired and actual number of children is the relationship between fertility status and family planning use. Do excess fertility women turn to family planning? How does their practice compare with that of other women? The relevant statistics are shown in Table 5.10.

Excess fertility women practice family planning or are sterilized more often than deficit fertility women (54 percent compared with 22 percent), but less often than par fertility women (60 percent). The difference is mainly with respect to sterilization, however, and not conventional family planning. The percentage of women who use conventional family planning methods does not vary significantly by fertility status (17, 20, and 18 percent, respectively, for the excess, par, and deficit fertility groups). It is instructive to note that even among the deficit fertility group, 18 percent use contraceptives, which must be to control spacing of births. About 37 percent of the excess fertility women and 40 percent of the par fertility women were sterilized, while the corresponding figure among the deficit fertility women was only 4 percent.

The pattern of family planning use does not change substantially if excess fertility is defined in terms of surviving children instead of children ever-born. A small but noteworthy difference, however, is that the percentage of users among excess net fertility women is higher than among par net fertility women. This is not the case with excess and par gross fertility women.

The three districts show some significant variation in family planning practice among excess fertility women. In Palghat, 71 percent of such women have not taken any steps to prevent additional pregnancies. Although the proportion of nonusers is smaller in the other two districts, it is still above 30 percent in both. Family planning programs have not served all the women who might have need of them -- particularly among those who report having more children than they desire. There is room for considerable increase in family planning practice and sterilization in these districts.

1/ The regression coefficients are:

Variable	Excess fertility	
	Gross	Net
Per capita household expenditures	-0.0004	-0.0004
Landownership	-0.0004	-0.0003

Table 5.10 Distribution of women by fertility status and family planning use, three districts combined, Kerala

Family planning	Excess fertility	Par fertility	Deficit fertility	Total
	Gross fertility status			
Nonusers	394	392	655	1,441
Conventional methods	149	199	155	503
Sterilization	323	396	31	750
Total	866	987	841	2,694
	Percentage			
Nonusers	46	40	78	53
Conventional methods	17	20	18	19
Sterilization	37	40	4	28
	Net fertility status			
Nonusers	162	498	761	1,421
Conventional methods	92	239	171	502
Sterilization	184	487	78	749
Total	438	1,224	1,010	2,672
	Percentage			
Nonusers	37	41	75	53
Conventional methods	21	20	17	19
Sterilization	42	39	8	28

Differentials in family planning use - including both sterilization and conventional methods - among excess fertility women can be related to certain demographic and socioeconomic variables, as discussed below.

Age and parity. Younger women and women of lower parity appear to practice family planning more frequently than older women and those of higher parity. This is true irrespective of the fertility status of the woman. The increased use of family planning at younger ages is highest among the par fertility women and lowest among the deficit fertility women (see Annex Table 12).

Education. About 37 percent of illiterate excess fertility women were sterilized or were using a conventional family planning method, compared with 76 percent of those with ten years of schooling. Even among the deficit fertility women, the practice of birth control was greater among the educated. The comparisons in Table 5.11 highlight the part which education may play in the increased adoption of birth control methods.

Table 5.11 Percentage of women using family planning by education and fertility status, three districts combined, Kerala

Education	Excess fertility	Par fertility	Deficit fertility
No schooling	37	30	9
1-4 years	60	63	14
5-9 years	65	69	28
10+ years	76	72	39
All women	55	60	24

Landownership. Ownership of land is not a significant factor influencing the use of contraceptives, especially among excess fertility women. The percentage of women who practice family planning is more or less the same at all levels of landownership.

Family Planning Use by Excess Fertility Women: Regression Analyses

Not all women with excess fertility (or more children than desired) adopt family planning methods. What are the factors that lead to family planning usage by some excess fertility women and not others? To answer this question, six regressions were undertaken, three for women with excess or par gross fertility and three for women with excess or par net fertility.

Regarding the use of conventional contraceptives, only two factors have statistically significant relationships to either net or gross excess and par fertility: education and landownership.2/ Family planning is

2/ The regression coefficients are:

Variable	Excess and par fertility	
	Gross	Net
Education	+0.046	+0.049
Landownership	-0.0002	-0.0002

related positively to education (linearly) and negatively to ownership of land. Thus, highly educated women from households with small landholdings are the most likely to adopt family planning, while illiterate women from households with large landholdings are the least likely to do so. The variance explained in the case of net fertility is 14.4 percent, of which 13.6 percent is contributed by education and 0.5 percent by landownership. Whether one uses children ever-born or children surviving does not change the conclusions. Other things being equal, one additional year of schooling increases by 5 percent the proportion of excess or par fertility women using conventional family planning.

The propensity to get sterilized is affected by several variables in addition to education, but the total variance explained by them is much smaller ($R^2 = 0.05$ for gross or net parity). The economic variables are negatively and significantly related to sterilization, which decreases as a household's land or per capita expenditure increases. Poorer women with excess fertility thus have a greater chance of being sterilized than richer women with the same education and the same number of children. The principal variable, however, is not education but parity, which has a significant relationship at the first degree as well as at the second degree. The turning point is parity 3.6. At parities 4 and above, the higher the parity, the less the chance of getting sterilized. The relationship with education is also curvilinear. In this case, the turning point is 6.7 years of schooling; over 7 years, the longer the schooling the less is the chance of getting sterilized.

If conventional family planning and sterilization are combined, the overall picture does not change substantially ($R^2 = 0.10$ for gross or net parity). Education emerges as the principal factor, with a positive relationship at lower levels of education and a negative relationship at very high levels. Parity is second in importance, with a positive relationship at lower parities and a negative relationship at parities above 3. The negative relationship with ownership of land persists, but that with per capita household expenditure becomes statistically insignificant.

Finally, caste is not a factor in the adoption of birth control methods by excess fertility women. This is an important finding because it indicates that cultural background plays a minor part in family planning. It is the acquired traits such as education and parity that influence a woman's decision to accept birth control methods once she achieves or exceeds her desired family size.

Desire for Another Child

In the second part of this chapter we take an alternate view of fertility decisions. A couple's desired family size is regarded not as a fixed figure but rather as a sequential number recalculated after each birth. All the women currently married and not sterilized themselves or with a sterilized husband were asked,

> "As far as you know, is it physically possible for you and your husband to have a child, supposing you wanted one?"

Those who answered "yes" were asked further,

"Do you want to have a child sometime?"

This analysis is confined to the 1,229 currently married women who answered this question. 3/

Differentials

Of these 1,229 women, 598 (49 percent) did not want any additional children, 53 (4 percent) were not quite sure, and 578 (47 percent) wanted to have at least one more child. Combining those undecided and those not wanting an additional child, about 53 percent of the women did not express a desire for more children. The 47 percent who want at least one more child are over ten years younger than their counterparts who do not want another child, and they have, on average, fewer surviving children. Both they and their husbands have more education than the women who want no more children, accounting in part for a later age at marriage and a smaller desired family size. There are no differences in household expenditures among those who want an additional child and those who do not. The former, however, own slightly more land than the latter.

Table 5.12 Characteristics of currently married women by desire for another child, three districts combined, Kerala

Variable	Averages		
	Total women	Want no more children	Want another child
Age (years)	31.5	36.8	25.6
Age at marriage (years)	19.1	18.4	19.9
Schooling (years)	5.2	4.6	5.8
Husband's schooling (years)	6.1	5.6	6.7
Number of children surviving	2.7	4.0	1.2
Land owned (cents)	125.9	115.7	137.3
Monthly per capita household expenditures (Rs.)	492.0	490.5	493.6
Desired family size	3.2	3.5	2.8

3/

Currently married women	2,421
Currently married nonsterilized women (2,421-739)	1,682
Currently married nonsterilized fecund women (1,682-263)	1,419
Currently married nonsterilized fecund women who did not answer the question on desire for another child	190
Currently married nonsterilized fecund women who answered the question on desire for another child (1,419-190)	1,229
Want no more children	651
Want another child	578

Differentials in the desire for another child by caste are not insignificant. Christians are the least likely to want another child (39.4 percent) followed by the Nairs (44 percent), whereas the majority of the women belonging to the Scheduled Castes and Tribes do want another child (57.0 percent). There is only a slight difference between the Ezawas and the Muslims; nearly 50.0 percent of both groups want another child.

Desire for Another Child: Regression Analysis

Desire for an additional child (yes or no) was made the dependent variable in a multivariate analysis. All variables available from the survey which have some theoretical relation to the dependent variable were included in the regression as independent variables. In carrying out the analysis, a two-stage approach was employed.

First, since age and age at marriage are covariates of parity, the variance attributed to these two variables was separated. Of the 55.5 percent variance explained by the model, 48 percent, or 86 percent of the total variance in desire for another birth, is explained by these two demographic variables (Table 5.13). Age, which has the highest explanatory power (44 percent, or 79 percent of the total), but a relatively small regression coefficient, is negatively associated with desire for an additional birth. This inverse relation stems from the fact that older women are more likely to have had the opportunity to attain their desired family size and hence are less likely to want another birth. A similar explanation can be offered for the positive association between age at marriage and wish for additional births; women who married at older ages have had less opportunity to achieve their desired family size and hence show a greater proclivity toward wanting an additional child.

Of the remaining variables which showed a significant relation to the desire for another birth, the number of surviving children, not surprisingly, added the most in explaining the variance (it also had the highest regression coefficient): women with more surviving children were less likely to want an additional child. Likewise, son survivorship, which also had a high regression coefficient, was negatively associated with desire for an additional child. Muslim women were more likely than women of other groups to want an additional child. Finally, the level of education of the respondent had a negative association with desire for another child, although the regression coefficient was relatively small.

Table 5.13 Summary of regression of desire for another child

Independent variable	B-coefficient	Beta	F-value
Age	- 0.0248	- 0.426	225.3
Age at marriage	- 0.0165	0.124	28.7
Muslim	0.0720	0.049	4.4
Woman's years of schooling	- 0.0138	- 0.104	10.2
Number of children surviving	- 0.0865	- 0.359	133.8
Number of sons surviving	- 0.0636	- 0.062	7.4

Note: $R^2 = 0.55$. Other independent variables that did not have a significant relationship with the dependent variable are:

Husband's years of schooling
Household expenditures
Land owned
Financial help from children expected
Old age support from children expected

Fertility Preference and Family Planning Use

Of the women who did not want another child, 51 percent were practicing contraception by means of conventional family planning methods (Table 5.14), compared to 28 percent of the women who wanted another child. Table 5.15 presents bivariate relationships between socioeconomic and demographic variables on the one hand, and use of contraception among women who both did and did not want another child on the other hand. Except for the number of surviving children, the characteristics of women who used contraception were similar, irrespective of whether they wanted another child or not. They tended to be older, they married at an older age, both they and their husbands had more schooling, and they desired smaller families than those not using any method of contraception. Among contraceptive users who wanted no more children, however, completed family size exceeded desired family size; this was not the case for contraceptive users who wanted another child.

Table 5.14 Family planning use by desire for another child, three districts combined, Kerala

Desire for another child	Percentage of women	
	Not currently using any method	Using conventional methods
No/maybe	49.3	50.7
Yes	72.3	27.7

Table 5.15 Characteristics of currently married women by contraceptive practice and desire for another child, three districts combined, Kerala

Variable	Averages					
	Want no more children			Want another child		
		Contraceptive use			Contraceptive use	
	Total	No	Yes	Total	No	Yes
Age (years)	36.8	35.8	37.7	25.6	25.4	25.9
Age at marriage (years)	18.4	17.5	19.2	19.9	19.5	20.8
Schooling (years)	4.6	3.2	5.9	5.8	5.1	7.7
Husband's schooling (years)	5.6	4.4	6.8	6.7	6.0	8.6
Number of children surviving	4.0	4.3	3.7	1.2	1.2	1.4
Land owned (cents)	115.7	102.5	128.1	137.3	121.3	180.3
Monthly per capita household expenditures (Rs.)	490.5	424.4	552.5	493.6	448.5	613.4
Desired family size	3.5	3.9	3.1	2.7	2.8	2.6

Family Planning Use by Fertility Preference: Regression Analyses

Again a multivariate analysis was used, this time to study the factors affecting contraceptive use among women with different fertility preferences regarding another child. The independent variables are the same as those listed in Table 5.13. The dependent variable is current use of contraception.

The regression results confirm the findings of the bivariate analysis: preference for another child is not relevant to the decision to use contraception. Among both sets of respondents, those who wanted another child and those who did not, education and caste were important predictors of contraceptive use (Tables 5.16 and 5.17). As the level of education increased, women were more likely to practice contraception, irrespective of fertility preference. In addition, Christians were most likely to use a method of contraception, whether for spacing or for terminating fertility.

The other variables that had a significant relation with contraceptive use for women who did not want another child were age, household expenditures, and land. The first two had a positive association with the dependent variable. Landownership, contrary to the relationship suggested by the bivariate statistics, had a negative association: as the size of the landholding increased, the tendency to use contraception decreased. The regression coefficient, however, was very small (-0.0002). For women who did want another child, as the number of surviving children increased, so did the likelihood of practicing contraception.

Table 5.16 Summary of regression of use of contraception for women who do not want another child

Independent variable	B-coefficient	Beta	F-value
Age	0.0125	0.185	20.2
Christian	0.1425	0.125	9.2
Household expenditures	0.1025	0.119	5.9
Woman´s years of schooling	0.0385	0.285	21.6
Land owned	-0.0002	-0.082	4.3

Note: R^2 = 0.230. Other independent variables that did not have a significant relationship with the dependent variable are:

Age at marriage
Husband´s years of schooling
Number of children surviving
Number of sons surviving
Financial help from children expected
Old age support from children expected

Table 5.17 Summary of regression of use of contraception for women who want another child

Independent variable	B-coefficient	Beta	F-value
Christian	0.2575	0.227	25.5
Woman´s years of schooling	0.0249	0.205	11.3
Number of children surviving	0.0735	0.165	10.8

Note: R^2 = 0.190. Other independent variables that did not have a significant relationship with the dependent variable are:

Age
Age at marriage
Household expenditures
Husband´s years of schooling
Land owned
Number of sons surviving
Financial help from children expected
Old age support from children expected

In summary, the multivariate analysis suggests that fertility preference is not relevant to the decision to practice contraception. Educated women and Christians, both those that did and those that did not want more children, were likely to use a method of contraception. The only relevant demographic variable among women who wanted no more children was age. This is not surprising since older women are more likely to have completed their family formation.

Unmet Demand for Family Planning

The data discussed so far in this chapter seem to indicate that not all women who should have been using a contraceptive were doing so, whatever the reason; undoubtedly there is an unmet demand for family planning services in Kerala. What is the extent of this unmet demand, and among which women does it exist?

A woman can be said to have an unmet demand for family planning if (a) she is currently married, living with her husband, and not using a contraceptive; (b) neither she nor her husband is sterilized; and (c) she does not want any more children. A slightly different definition can be developed on the basis of desired family size. According to this, a woman has an unmet demand for family planning if she satisfies (a) and (b) above and if, in addition, the number of children she desires is less than or equal to the number of her surviving children.

The survey questions on desired number of children and on desire for additional children were sometimes answered rather casually by respondents; as a result, estimates of unmet demand based on these questions may not be reliable. Therefore, a third definition is based simply on the number of surviving children. A woman has an unmet demand for family planning services if she satisfies (a) and (b) above and if, in addition, she has three or more surviving children. The extent of unmet demand in the three survey districts combined, according to each of these three definitions, is given in Table 5.18. It varies from 12 to 23 percent according to the definition used. If the same ratio is applied to the whole of Kerala, then the number of women with an unmet demand for family planning in the State is between half a million and one million. In 1981 about half a million married women in the fertile ages in Kerala did not want an additional child, but were not using contraception to prevent pregnancy. About 650,000 women desired a number of children less than or equal to the number of living children they already had, but were not using contraception. Finally, about 850,000 women had three living children and were not using contraception.

The extent of unmet demand is not the same in all districts but is highest in Palghat (Table 5.18). The Palghat ratios indicate that unmet demand is more prevalent in the northern districts of Kerala than in the south.

Table 5.18 Percentage of women with an unmet demand for family planning, three districts combined, Kerala

Category	Three or more surviving children	Surviving children exceed desired children	Do not want another child
Ever-married women	20.5	15.8	11.9 (19.2) a/
Currently married women	22.8	17.6	13.3 (21.8)

a. The figures in parentheses are the rates for Palghat District.

Women with an unmet demand for family planning services were not unique; although their characteristics were somewhat different from those of all married women surveyed, the differences were not very great (Table 5.19). The largest number of women with an unmet demand fell in the 30-39 age group, among those with three surviving children who were illiterate and belonged to the Ezawa community. The highest rate of unmet demand was also among the same groups, except for the Ezawa community. The rate of unmet demand was higher among the Muslims (22 percent) than among the Ezawas (16 percent).

Table 5.19 Characteristics of women who do not want another child but are not using contraception, three districts combined, Kerala

Characteristic	Unmet demand for family planning (percentage of all married women)
Age	
20-24	3.0
25-29	10.2
30-34	18.4
35-39	21.1
40-44	14.9
45-49	11.4
All women	13.3
Surviving children	
1	2.0
2	9.2
3	16.5
4	20.5
5 +	21.9
Education	
No schooling	24.0
1-4 years of schooling	12.9
5-9 years of schooling	8.9
10+ years of schooling	7.6
Caste, Religion	
Christians	10.4
Nairs	12.8
Ezawas	16.0
Scheduled Castes	17.0
Muslims	21.6

The principal reason for not using contraception cited by women with an unmet demand for family planning was disapproval of the family planning program (true for more than half the women; see Table 5.20). This disapproval, given the situation in Kerala, may well indicate dissatisfaction with sterilization as a contraceptive method. If nonterminal methods of fertility control were made available to these women, perhaps acceptance would be greater. In a few cases women lacked knowledge about the program, but on the whole the problem appears program-related, requiring demand creation and not simply the provision of more information about the services offered. It is therefore necessary to enquire further into the reasons why many women and their husbands disapprove of family planning even though they do not want any more children.

Table 5.20 Reasons for not using contraception given by women who do not want another child, three districts combined, Kerala

Reason	Percentage	
Husband disapproves	37.2	(36.0) [a/]
Wife disapproves	15.4	(24.5)
Does not know where to go for services	5.1	(7.2)
Believes that wife cannot conceive	9.1	(4.3)
Never heard of family planning	3.2	(3.6)
Other reasons	30.0	(24.5)

a. The figures in parentheses are the rates for Palghat District.

Chapter 6. Marriage as a Factor in the Fertility Trend

The mean age at marriage of females in Kerala has been quite high (21.3 years in 1961-71 compared to 16.7 for India as a whole). The present study analyzed the age at marriage of ever-married women, which being a truncated sample gave a biased estimate (downward) of the actual average age at marriage of all women in Kerala, and came to the following conclusions:

- The average age at marriage of women increased from 17.2 years for those married in 1950-54 to 20.7 years for those married in 1975-79.

- The average age at marriage was higher for educated women (21.8 years among those with ten or more years of schooling) than for illiterate women (17.5 years); higher for Latin Christians (20.1), Syrian Christians (19.8), and Nairs (19.6) than for Muslims (17.0) and Scheduled Castes (18.2); and higher for women in households better off economically than for women in households less well off.

- Most socioeconomic variables (education, caste, and so on) have an independent effect on age at marriage even when the effects of all other variables are controlled.

- About 30 percent of the fertility decline in Kerala between 1965-70 and 1975-80 can be traced to an increase in the age at marriage and a consequent decrease in the proportion of women married. The effect of age at marriage on the fertility decline has been increasing during the period 1965-80.

Marital Status Distribution

According to the survey 1,646 out of a total of 4,315 women aged 15-49 were never married; 2,669 were married or had been married; 2,371 were currently married; and the remainder were widowed, divorced, separated, or of unknown marital status. These figures imply that in 1980 over one-third (38 percent) of all women of reproductive age in Kerala were never married and therefore had no chance for reproduction. This represents a drastic increase in the proportion of women not exposed to pregnancy, from 28 percent in 1971 to 38 percent in 1980 (Table 6.1).

Table 6.1 Distribution of women aged 15-49 by marital status, 1971 and 1980, Kerala

Marital Status	Census 1971 Kerala State		Survey 1980 Three districts combined	
	Number (thousands)	Percent	Number (thousands)	Percent
Never married	1,468	28.3	1,646	38.1
Ever-married	3,720	71.7	2,669	61.9
Currently married	3,318	63.9	2,371	54.9
Widowed	255	4.9	145	3.4
Divorced	-	-	47	1.1
Separated	147	2.8	66	1.5
Unknown	-	-	40	0.9
Total	5,188	100	4,315	100

Among the ever-married women, some were not currently married and therefore were also not exposed to pregnancy. The proportion of women currently married (among all women) was 55 percent in 1980 compared with 64 percent in 1971. A crude estimate of the fertility reduction due to these changes in marital status distribution between 1971 and 1980 is about 14 percent.

If the never-married women are excluded from the figures, then the proportion of women currently married has declined very marginally, the proportion widowed has declined significantly, and the proportion divorced or separated has increased (Table 6.2). The net effect of these changes on fertility is, on the whole, very small. The pronatal effect of a decrease in widowhood is offset by the antinatal effect of an increase in divorce and separation.

Table 6.2 Percentage of ever-married women by marital status, 1971 and 1980, Kerala

Marital status	1971 [a]	1980 [b]
Currently married	89.2	88.8
Widowed	6.9	5.4
Divorced)		1.8
Separated)	4.0	2.5
Unknown	-	1.5

a. Census of India, 1971, Kerala.
b. Survey; three districts combined.

The overall change in the distribution of women in the reproductive ages by marital status is closely reflected in most younger age groups, but the pattern is different for some of the older age groups (Table 6.3).

Table 6.3 Percentage of women never married and currently married by age, 1971 and 1980, Kerala

Age	Never married		Currently married	
	1971 [a]	1980 [b]	1971 [a]	1980 [b]
15-19	81.0	91.5	18.1	7.6
20-24	32.7	55.4	64.1	40.2
25-29	9.3	18.9	85.5	74.8
30-34	5.3	10.0	86.8	82.8
35-39	3.7	10.6	85.2	81.8
40-44	3.5	3.7	78.8	81.7
45-49	3.1	5.9	72.9	76.8
All ages	28.3	38.1	63.9	54.9

a. Census of India, 1971, Kerala.
b. Survey; three districts combined.

The proportion of never-married women has increased in all age groups, especially among those aged 20-24. This increase has not lowered the proportion of currently married women above the age of 40; for all other ages, however, there has been a considerable decline. The sharp drop in currently married women ages 20-24, from 64 percent in 1971 to 40 percent in 1980, has made possible a fertility decline of 37 percent in this group due to the marriage factor alone.

A similar breakdown of widowed women by age indicates some decline between 1971 and 1980 in most age groups. Thus, the effect of an increase in the proportion of those never married has been partly offset by a decline in the proportion widowed.

Age at Marriage: Trends and Differentials

Women in Kerala have tended to marry later than Indian women generally. For example, in 1971 the average age at marriage was 17.1 years in India and 20.9 in Kerala. The corresponding figures in 1961 were 15.9 and 19.9 years respectively.

Not only has the average age at marriage in Kerala been high, it has been increasing in recent years. The age at which 50 percent of the total number of women are married (median age), calculated on the basis of the proportion single, is shown in Table 6.4 for the three survey districts. The results confirm both the high average age at marriage and the steady increase in age at marriage over time. Alleppey has the highest median age at marriage and Palghat the lowest. The pattern was the same in 1961 as in 1980.

Table 6.4 Median age at marriage by district, 1961, 1971, and 1980, Kerala

	1961	1971	1980
Palghat	18.6	20.1	21.7
Ernakulam	20.7	21.0	23.5
Alleppey	20.9	21.8	23.9
Kerala	18.4	20.7	-

More detailed information on trends in the average age at marriage is given in Table 6.5. All the marriages (2,680) were classified according to date of occurrence, and the mean age of the women at the time of marriage was calculated for each five-year period. Each recent period shows a higher age at marriage than the previous one in all three districts. Palghat consistently has the lowest mean age and Alleppey the highest. The difference between these two districts narrowed between 1937 and 1964 but has widened since then.

Table 6.5 Mean age at marriage by marriage date and district, Kerala a/

Marriage year	All districts	Palghat	Alleppey	Ernakulam
1937-49	15.2	14.4	16.2	15.2
1950-54	17.2	16.5	17.8	17.2
1955-59	18.0	17.2	18.2	18.5
1960-64	18.5	17.8	18.6	19.2
1965-69	19.2	18.0	19.8	19.7
1970-74	19.7	18.6	20.0	20.3
1975-80	20.7	19.5	21.7	20.9
Overall mean	18.8	17.7	19.2	19.4
Number of women	2,680	899	920	861

The average age at marriage varies somewhat by the socioeconomic status of women as well as by age. Younger women, on the whole, have a higher age at marriage (Table 6.6). This is due partly to a rising trend in the age at marriage, and partly to differences between the socioeconomic characteristics of younger and older women. Illiterate women have a lower age at marriage (Table 6.7); the difference between them and those with at least ten years of schooling is as much as 4.3 years. Among the various religious and caste groups, Muslims have the lowest age at marriage (17 years) and Christians have the highest (20 years) (Table 6.8). Differentials due to ownership of land and household expenses, however, proved to be of little significance.

Table 6.6 Average age at marriage of women by age, three districts combined, Kerala

Age	Average age at marriage (years)
15-19	16.8
20-24	18.7
25-29	19.6
30-34	19.2
35-39	18.7
40-44	18.1
45-49	18.5
All women	18.8

Table 6.7 Average age at marriage of women by education, three districts combined, Kerala

Education	Average age at marriage (years)
No schooling	17.5
1-4 years of schooling	18.3
5-9 years of schooling	19.1
10+ years of schooling	21.8
All women	18.8

Table 6.8 Average age at marriage of women by caste, three districts combined, Kerala

Caste	Average age at marriage (years)
Scheduled Castes/Tribes	18.2
Nairs	19.6
Ezawas	18.8
Syrian Christians	19.8
Latin Christians	20.1
Muslims	17.0
Others	18.6
All women	18.8

Factors Related to Age at Marriage: Regression Analyses

Seven regressions were run to identify the factors related to age at marriage (see Table 6.9). Most of the independent variables turned out to have statistically significant relationships.

A simple classification of marriages as "early" (at ages 20 or younger) or "late" (older than age 20) revealed that late marriage is significantly and positively associated with caste, education, and year of marriage (R^2 = 0.09). Year of marriage is the largest contributor to the explained variance (66 percent), followed by caste (22 percent) and education (12 percent). Substantially higher proportions of Nair and Christian women married late. Similarly, educated women and women who married more recently had higher proportions in the late marriage group.

Two other regressions (II and III) used the actual age at marriage as the dependent variable. The year of marriage (Y_m), one of five independent variables, appears in both first and second degree form in one of the regressions. Of the total variance explained by this regression (25 percent), 69 percent is contributed by Y_m and an additional 4 percent by $(Y_m)^2$. Both these contributions are statistically very significant. The change in age at marriage was not the same in all years, but was larger in earlier years. Between 1960 and 1961, the average age at marriage is estimated to have increased by 1.94 months; between 1980 and 1981, the estimated increase was only 0.45 months.

Caste, education, and household expenditures are significantly -- and positively -- related to age at marriage, while landownership is not. After age at marriage, caste contributed the largest proportion of the explained variance (18 percent), followed by education (6 percent) and household expenditures (4 percent). The regression coefficient for education is 1.074; that is, for each one-year increase in schooling, the average age at marriage increases by 1.07 months. The increase is much smaller than the four-month difference observed in a one-way comparison between age at marriage and educational attainment.

Table 6.9 Summary of regression analyses of age at marriage (standardized regression coefficients)

Dependent variable	Regression number						
	I	II	III	IV	V	VI	VII
Caste	0.09033	0.14207	0.14882	0.12594	0.12604	0.13265	0.17904
Year of marriage	0.20388	1.43581	0.39241	0.54195	0.52505	0.96873	0.12913
(Year of marriage)^2	0	-1.05203	0	-0.01710	0	-3.57104	0
Years of schooling	0.12251	0.08595	0.07795	0.05326	0.05300	0.07054	0.14802
Land owned (cents)	-	-	-	-	-	-	-
Household expenditures	-	0.10768	0.10708	0.11130	0.11131	0.08340	-
R^2	0.09235	0.24945	0.23716	0.35039	0.35039	0.38412	0.10010

Notes: - indicates that the coefficient was not significant at the 95 percent level.
0 indicates that the variable was not used in the regression.

Dependent variables and samples in regressions I - VII

I: Early (age 20 or younger) or late (over age 20) marriage (all ever-married women)
II,III: Age at marriage, months (all ever-married women)
IV,V: Age at marriage, months (ever-married women over age 25)
VI: Age at marriage, months (ever-married women who married before age 25)
VII: Age at marriage, months (ever-married women who married during the 1970s)

In regressions IV and V the analysis was confined to women over 25. This changes neither the earlier direction of the relationship nor the statistical significance of the variables. Caste, year of marriage, education, and household expenditures remain the principal factors affecting age at marriage of women; all are positively correlated. The total explained variance increases to 35 percent (from 25 percent for all women), but year of marriage remains the major factor, accounting for 83 percent of the explained variance, followed by caste (12 percent), household expenditures (3 percent), and education (2 percent). Amount of land owned is irrelevant once the other factors are taken into consideration.

Regression VI confined the analysis to women who married before the age of 25 (R^2=0.384). All the variables except land are significantly correlated to age at marriage, with year of marriage again accounting for most of the explained variance (Y_m = 51 percent; $[Y_m]^2$ = 37 percent). The effect of calendar year is positive until 1970 and negative afterwards. Education has a coefficient of 0.85 (an 8.5-month increase for ten more years of schooling), which is lower than the coefficient when all marriages are considered.

The final regression used marriages which took place in the 1970s as the sample population. The total variance explained was only 10 percent, highlighting factors not included in the regression. The coefficient of education is higher (a 13.7-month increase for ten more years of schooling), but the coefficient for per capita household expenditures became insignificant. In terms of the variance explained by each variable, caste is the principal factor (44 percent), followed by per capita household expenditures (21 percent).

In summary, the multivariate analysis indicated that age at marriage is statistically affected by caste, year of marriage, and number of years of schooling, but not by ownership of land. Per capita household expenditures are statistically significant in all but one regression (VII), in which only recent marriages are included. The inclusion of all these variables explains a maximum of 38 percent of the total variance in age at marriage. This is a fairly good specification, except that 20 percent of the 38 percent is explained by the time trend and not directly by the socioeconomic variables.

The Marriage Factor and the Fertility Decline

The date of marriage of each married woman was obtained in the survey along with her date of birth. From these data, it was possible to reconstruct the proportion of women married at any given time. This information is displayed in Table 6.10.

WH 130
04701 1984
COMMUNITY HEALTH CELL
LIBRARY
AND
DOCUMENTATION
UNIT

Table 6.10 Percentage of women married by age, three districts combined, Kerala

Age	Percentage			
	1965	1970	1975	1980
15-19	28.7	22.6	13.0	9.5
20-24	72.6	71.0	59.9	46.1
25-29	95.8	86.1	87.1	80.8
30-34	90.8	98.8	89.4	91.2
35-39	(96.6)	92.2	99.0	89.8
40-44	(94.4)	(94.4)	92.2	99.3
45-49	(96.6)	(96.6)	(96.6)	92.2

Note: The figures in parentheses cannot be estimated from the survey data, but are assumed.

Table 6.11 Marital fertility rates by age, three districts combined, Kerala

Age	1965-70	1970-75	1975-80
15-19	201	206	200
20-24	375	334	333
25-29	344	292	280
30-34	255	213	162
35-39	198	127	106
40-44	(99)	74	49
45-49	(24)	(18)	12
Fertility rate for married women	7.48	6.32	5.71
Fertility rate for all women (TFR)	5.91	4.59	3.69

Note: Rates in parentheses are estimates based on trends in previous age groups.

Estimated marital fertility rates for 1965-70, 1970-75, and 1975-80 are shown in Table 6.11. The marital fertility rate for 1965-70 is 7.48 and the total fertility rate (TFR) is 5.91. If the proportion married during 1970-75 had been applied to the marital fertility rate of 1965-70, the total fertility rate would have been 5.63 (Annex Table 13). The difference (5.91-5.63 = 0.28) is due to a decline in the proportion of women married. The actual total fertility rate is 4.59. We may conclude the following:

TFR 1965-70	5.91
TFR 1970-75	4.59
Difference (decline)	1.32
Due to marriage factor (5.91-5.63)	0.28 (21 percent)
Due to fertility decline (5.63-4.59)	1.04 (79 percent)

A similar analysis for 1970-75 and 1975-80 gives the following results:

TFR 1970-75	4.59
TFR 1975-80	3.69
Difference (decline)	0.90
Due to marriage factor (4.59-4.23)	0.36 (40 percent)
Due to fertility decline (4.23-3.69)	0.54 (60 percent)

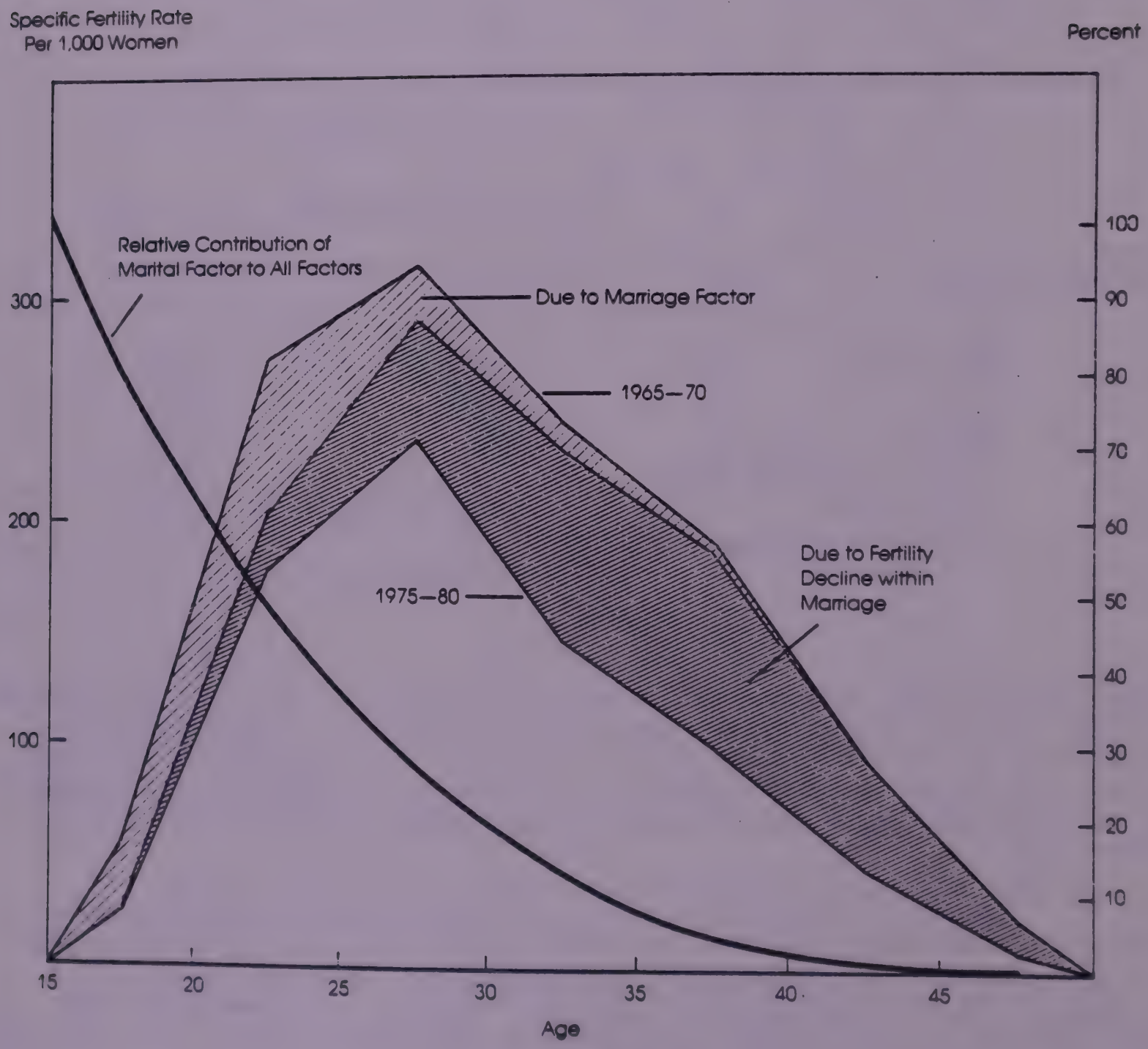
Finally, for the 1965-70 to 1975-80 period, the overall decomposition is as follows:

TFR 1965-70	5.91
TFR 1975-80	3.69
Difference (decline)	2.22
Due to marriage factor (5.91-5.23)	0.68 (31 percent)
Due to fertility decline (5.23-3.69)	1.54 (69 percent)

Thus, the marriage factor played a significant role in the fertility decline during 1965-80. Roughly 31 percent of the fertility decline during this period was due to the decline in the proportion of women married, with the balance or 69 percent due to fertility decline within marriage. The effect of the marriage factor was greater in the ten-year period 1970-80 than in 1965-75.

Figure 6.1, based on a more detailed analysis by age (see Annex Table 13), indicates that the effect of marital status on fertility was by far the greatest for younger ages, principally the 20-24 age group (52 percent of the total decline) and the 15-19 age group (22 percent of the total decline). At the same time, there is no age group where there was any increase in fertility due to the marriage factor.

Figure 6.1
Specific Fertility Rates, 1965—70 and 1975—80, and
Fertility Decline Due to Marriage and Fertility Factors, Kerala



World Bank—25088

Chapter 7. Family Planning as a Factor in the Fertility Trend

Kerala is reported to be one of the most successful States of India with respect to family planning practice. As of 1980 about 806,000 vasectomies and 675,000 tubectomies had been performed. The number of IUD insertions was almost 400,000, and 154,000 people were using conventional contraceptives. In 1980 about 30 percent of the currently married women were effectively protected from pregnancy through the services of the official family planning program. Acceptance of family planning is estimated to have caused a reduction of about 10 points in the crude birth rate by 1980, which agrees fairly well with the Government of India's Sample Registration System (SRS) data on birth rates.

The sample survey gave the following results concerning contraceptive knowledge and practice:

- Almost all ever-married women in Kerala knew of at least one birth control method. Lack of general knowledge about the family planning program is not a major problem in the State any more.

- About 52 percent of the currently married women in the three districts were sterilized themselves, had a sterilized husband, or were using a conventional family planning method. Contraceptive usage was greater than the level reported by the official statistics.

On sterilization:

- Some 28 percent of the ever-married women and 31 percent of the currently married women were sterilized, or had a husband who was sterilized.

- The proportion of sterilization was highest in the age group 30-34 years (46.2 percent of all currently married women), among three-parity women (49 percent), and among Christians and Ezawas.

- The propensity to be sterilized is curvilinearly related to socioeconomic status, with the highest propensity occurring at an intermediate level - for example, among those with 1-4 years of schooling, or living in households with mid-range monthly expenditures.

- Overall, there is a negative association between sterilization and the economic level of the household in which the woman lives.

On conventional contraceptive use:

- About 19 percent of ever-married women and 31 percent of currently married, nonsterilized women were using some conventional family planning method.

- Not all the conventional contraceptive users were effectively protected against pregnancy; less than half (43 percent) were using relatively reliable methods such as IUDs, pills, or condoms; others were practicing abstinence, safe period methods, withdrawal, and so on.

- Use of a conventional contraceptive was positively related to socioeconomic status: it was highest among women with ten or more years of education; highest among Syrian-Christians; highest among women in upper-income households, in the upper landownership group, and so on.

On all family planning methods:

- The principal determinants of contraceptive use (sterilization or conventional methods) were excess fertility, education of the woman, and age. Education has a negative effect on sterilization at higher levels of schooling.

- Socioeconomic and demographic variables explain only a small portion (less than 20 percent) of the total variation in knowledge and practice of family planning and in acceptance of sterilization. Factors related to the family planning program itself--such as incentives, official blessing, and an efficient organization--are likely to have played a more important role than socioeconomic factors in determining whether a particular couple adopted family planning.

- Sterilization alone could explain much of the fertility decline not accounted for by increase in age at marriage. The impact of conventional contraceptives on fertility is very small.

Knowledge of Family Planning Methods

All ever-married women were asked the question:

> "As you know, there are various methods a couple could resort to with a view to delay the next pregnancy or to avoid pregnancy. Do you know of, or have you heard of, any of these ways or methods?"

After the respondents' answers to this question were recorded, the methods not mentioned were described to them one by one, and each woman was asked whether she knew or had heard of any of them, and whether she had ever used any of them.

The responses received indicate that married women in Kerala are aware of birth control methods, both conventional ones and sterilization. Of the 2,694 women to whom the above question was put, 2,383 or 88 percent answered spontaneously that they knew about some birth control method, while only 311 or 12 percent said they did not. The level of knowledge was

greatest in Alleppey (95 percent) and least in Palghat (80 percent), with Ernakulam falling in between. Knowledge of birth control methods among Kerala women is higher than in Pakistan (75 percent) or Indonesia (77 percent) but lower than in some other countries of Southeast Asia, such as the Republic of Korea (97 percent) and Malaysia (92 percent), according to a rough comparison made by the World Fertility Survey (Vaessen 1980, Table 1).

Various demographic and socioeconomic characteristics are related to a woman's contraceptive knowledge (Table 7.1). Among the ever-married women surveyed, knowledge about family planning was highest among those 30-34 years old (92 percent) and lowest among those 15-19, about one-fifth of whom had not heard of any family planning method. The variation by parity is an inverted J-shaped curve, with the highest degree of knowledge at parity 3. The relation to age at marriage is somewhat linear, with knowledge increasing along with age at marriage.

Years of schooling have a very significant and positive impact. While about 25 percent of the women with no education had never heard of any family planning method, all but 2 percent of the women with ten years or more of schooling knew of at least one method. Each increase in the number of years in school is accompanied by an increase in the percentage of women with knowledge about family planning methods. Landownership, on the other hand, makes little difference.

Table 7.1 Knowledge of family planning methods by selected characteristics of woman, three districts combined, Kerala

Age	A	B	Parity	A	B
15-19	81	2.1	0	76	2.4
20-24	86	2.9	1	86	2.9
25-29	90	3.1	2	91	3.2
30-34	92	3.2	3	94	3.3
35-39	90	3.0	4	89	2.8
40-44	88	2.8	5	91	2.8
45-49	85	2.5	6	88	2.7
All ages	89	2.9	7	82	2.5
			8+	89	2.5
Education	**A**	**B**	**Landownership**	**A**	**B**
No schooling	75	1.9	Less than 10 cents [a]	87	2.7
1-4 years	89	2.7	10-49 cents	87	2.8
5-9 years	94	3.3	50-99 cents	91	3.0
10+ years	98	4.2	100+ cents	90	3.2

Note: A = percentage of women who knew at least one family planning method.
B = average number of family planning methods known.

a. One cent equals 1/100th of an acre.

Practice of Family Planning

All of the ever-married women surveyed were questioned about their family planning practices. The responses were then analyzed to determine how widespread fertility regulation was, the extent to which various methods were relied upon, and the relationship between differences in usage and a number of demographic and socioeconomic factors. Finally, it was possible to extract from the data an estimate of the actual contribution of family planning to the fertility decline in Kerala.

Conventional Methods

Of the 2,671 women who answered the question on family planning practice, 908 have used conventional family planning methods at least once in their lifetime and 502 were doing so at the time of the survey. These figures imply that 406 women who had used some conventional method in the past had stopped. This does not mean, however, that all of these women were unprotected; in fact, 217 of them were subsequently sterilized. The following distribution shows how many women were exposed to pregnancy, and, of these, how many used a family planning method.

	Number of women	Percentage of ever-married women	Percentage of exposed women
Total ever-married	2,671	100.0	-
Sterilized	746	27.9	-
Currently not married	298	11.1	-
Pregnant	31	1.2	-
Total exposed	1,596	59.8	100
Ever-users of family planning who were not subsequently sterilized	691	25.9	-
Current users of family planning	502	18.8	31.5
Discontinuers of family planning	189	7.1	
Unprotected	1,094	41.0	68.5

Of the 1,596 women exposed to pregnancy, 502 used some form of conventional family planning. The balance of 1,094 were unprotected; they constitute 41 percent of all ever-married women, or 69 percent of all exposed women.

Conventional contraception was practiced by about 32 percent of the exposed women, the majority of whom relied on methods that were relatively inefficient, such as withdrawal or rhythm. A total of 43 percent of these women, however, or 8 percent of all ever-married women, were using a relatively efficient conventional family planning method, including condoms (30 percent), IUDs (8 percent), and pills (5 percent). Applying a formula similar to the one followed by the Government of India, it can be estimated

that the usage of conventional family planning methods by these women is equivalent to about 30 sterilizations (compared to 746 women or husbands actually sterilized). Conventional family planning practice, in other words, added little to the fertility decline in the State.

The usage rate of conventional family planning methods is very low in Palghat District; only about 7 percent of the ever-married women there practiced some form of conventional contraception, compared to 26 percent in Alleppey District (Table 7.2). At younger ages, women in Ernakulam are more prone to use conventional family planning methods than women in Alleppey, but at older ages the reverse situation prevails. This is partly due to the different rates of sterilization in these two districts. If the usage rate of conventional contraceptive methods is calculated for nonsterilized women, then the two districts are very close: 38 percent in Alleppey and 37 percent in Ernakulam. The differentials by age remain unaffected, however. The usage rate is significantly higher in Ernakulam than in Alleppey at younger ages, and lower at older ages.

Table 7.2 Percentage of ever-married women currently using conventional family planning methods by district, Kerala

Age	Palghat	Ernakulam	Alleppey	Total
15-19	3.6	18.2	7.8	7.8
20-24	5.7	30.9	26.7	21.1
25-29	9.5	28.1	25.5	21.3
30-34	6.6	23.9	28.5	19.5
35-39	8.1	17.8	27.2	18.2
40-44	8.1	26.2	22.5	19.1
45-49	2.1	14.0	28.0	15.5
All	6.5	23.5	26.1	18.8

Age. Conventional family planning practioners are fairly uniformly distributed by age. The proportion of ever-users and current users remains fairly constant at about 35 percent for ever-users and about half that for current users. Some variation is noticed when the sterilized women are removed from the denominator, as in Table 7.3: family planning practice then increases with age up to 35 years, after which it decreases. This is the result of two conflicting trends. The practice of family planning is greater among the better educated, and younger women have more education than older ones. On the other hand, family planning practice increases with age as the desire for protection against pregnancy becomes stronger and as knowledge of family planning methods accumulates. Given these opposing trends, the incidence of family planning practice is greatest among those in the middle age groups.

Table 7.3 Percentage of women using conventional family planning methods by age, three districts combined, Kerala

Age	All ever-married women		Currently married non-sterilized women	
	Current use	Ever-use	Current use	Ever-use
15-19	7.8	14.4	8.9	16.5
20-24	21.1	32.1	25.7	39.0
25-29	21.3	36.6	32.7	56.1
30-34	19.5	37.6	39.9	77.0
35-39	18.2	35.3	36.0	69.8
40-44	19.1	36.0	37.3	70.1
45-49	15.5	29.6	26.3	50.2
All	18.8	33.9	30.9	55.9

Parity. The relationship between family planning and parity is somewhat similar to that described for age. The highest rate of use is at parity 2, at which level about 45 percent of all ever-married women have at some time used a family planning method; 29 percent were currently doing so. If we exclude the sterilized women from the denominator, the proportions given in Table 7.4 are obtained.

Table 7.4 Percentage of women using conventional family planning methods by parity, three districts combined, Kerala

Parity	All ever-married women		Ever-married nonsterilized women	
	Current use	Ever-use	Current use	Ever-use
0	4.3	11.3	4.3	11.3
1	24.9	34.2	25.9	35.5
2	29.0	45.5	39.3	61.6
3	17.9	39.2	32.2	70.2
4	16.4	36.3	28.3	62.6
5	16.8	32.1	27.9	53.6
6	14.6	30.0	21.4	44.3
7	9.3	25.6	13.2	36.3
8	14.9	29.7	20.8	41.7
9	22.8	28.1	31.7	39.0
10+	16.3	23.3	18.9	27.0
All	18.8	33.9	25.9	47.0

Socioeconomic characteristics. With age at marriage the relationship is fairly linear (Annex Table 14): women who marry late tend to adopt conventional family planning methods more often than women who marry early. Similarly, women who have more schooling practice family planning in greater numbers than women who are illiterate. The increase in the proportion of women currently practicing family planning with an increase in years of schooling is very sharp, from 6.3 percent for those with no schooling to 40.3 percent for those with ten or more years (Table 7.5). The relation to per capita household expenditures is also sharply linear, with an increase from 7 percent to 33 percent between the lowest expenditure class and the highest (Table 7.6).

Table 7.5 Percentage of women using conventional family planning methods by education, three districts combined, Kerala

Education	All ever-married women		Ever-married nonsterilized women	
	Current use	Ever-use	Current use	Ever-use
No schooling	6.3	12.9	8.0	16.5
1-4 years	15.1	30.8	22.9	46.5
5-9 years	23.4	41.8	33.1	59.2
10+ years	40.3	62.5	49.6	76.8
All	18.8	33.9	25.9	47.0

Table 7.6 Percentage of women using conventional family planning methods by household expenditures, three districts combined, Kerala

Monthly per capita household expenditures (Rs.)	All ever-married women		Ever-married nonsterilized women	
	Current use	Ever-use	Current use	Ever-use
Below 30	6.5	13.0	8.2	16.6
30-49	13.7	25.0	18.8	34.2
50-59	16.2	29.7	24.0	44.1
60-79	16.1	34.8	23.6	50.9
80-119	27.2	44.7	38.9	63.9
120+	33.4	58.3	40.9	71.2
All	18.8	33.9	25.9	47.0

Finally, caste is an important variable affecting family planning usage. Scheduled Castes, Scheduled Tribes, Muslims, and Ezawas have relatively low proportions of users, while Christians have the highest (Table 7.7).

Table 7.7 Percentage of women using conventional family planning methods by caste, three districts combined, Kerala

Caste	All ever-married women		Ever-married nonsterilized women	
	Current use	Ever-use	Current use	Ever-use
Scheduled Castes/ Tribes	9.3	20.1	13.0	28.3
Muslims	10.4	21.7	13.3	27.7
Ezawas	14.8	28.7	21.9	42.7
Nairs	24.5	44.7	32.3	58.9
Syrian Christians	32.1	55.5	48.0	83.1
Latin Christians	32.3	49.6	44.1	67.7
All	18.8	33.9	25.9	47.0

Sterilization

The sterilization rate in Kerala State as a whole is substantially higher than in many countries. A few comparisons are given in Table 7.8.

Table 7.8 Percentage of exposed women sterilized, selected countries

Country	Percentage [a]/
Bangladesh	1.0
Fiji	20.2
Indonesia	0.4
Jordan	2.8
Republic of Korea	6.6
Malaysia	4.9
Nepal	2.1
Pakistan	1.4
Philippines	7.1
Sri Lanka	12.9
Thailand	11.5
India	20.0
Kerala	31.5

a. Both male and female sterilizations for contraceptive purposes are included.

In this section we define a woman as sterilized if either she or her husband is sterilized. The total number of women surveyed who were sterilized (or whose husbands were sterilized) was 750, or 28 percent of all the ever-married women and 31 percent of the currently married women. Thus, nearly a third of the exposed women in Kerala were sterilized (Table 7.9). As in the case of conventional family planning use, the three districts varied considerably, and similarly, with respect to the prevalence of sterilization. In Ernakulam 37 percent of ever-married women were sterilized, but in Palghat only 15 percent were. In the younger age groups Alleppey had a higher proportion of sterilized women, but at ages above 25 years the proportion in Ernakulam was significantly higher.

Table 7.9 Percentage of ever-married women sterilized by district, Kerala

Age	Palghat	Ernakulam	Alleppey	Three districts combined
15-19	-	-	7.7	1.1
20-24	4.1	8.1	9.2	7.1
25-29	16.1	34.7	26.1	26.1
30-34	25.2	56.0	46.4	42.0
35-39	20.3	56.2	23.4	40.5
40-44	16.1	41.0	40.4	33.0
45-49	9.9	30.7	25.0	21.5
All	14.7	37.2	32.0	27.9

Age. The greatest number of sterilized women in the three survey districts, 48 percent of the total, were in the 30-39 age group. The average age of a sterilized woman was 34.4 years. Age has an important bearing on the propensity to accept sterilization. At 15-19 years, very few women were sterilized (Table 7.10). The proportion increases considerably with the wife's age up to 30-34 years, in which age group about 42 percent of all ever-married women were sterilized (56 percent in Ernakulam District). At older ages the proportion of sterilized women decreases, partly due to the fact that the proportion of currently married women decreases, but also because the propensity to be sterilized among older currently married women also decreases.

Table 7.10 Percentage of women sterilized by age, three districts combined, Kerala

Age	Ever-married	Currently married
15-19	1.1	1.3
20-24	7.1	8.0
25-29	26.1	28.6
30-34	42.0	46.2
35-39	40.5	44.5
40-44	33.0	39.1
45-49	21.5	26.7
All	27.9	31.5

Parity. The relationship between sterilization and parity is also curvilinear, with the highest incidence of sterilization among three-parity women. The likelihood of sterilization increases sharply between parities 1 and 2 and again between parities 2 and 3. The proportions remain somewhat stable at parities 3, 4, and 5, and then decrease (Table 7.11). The average parity of a sterilized woman is about 4.1. The mode is 3, and the median parity is very close to the mode, 3.2.

Table 7.11 Percentage of women sterilized by parity, three districts combined, Kerala

Parity	Ever-married	Currently married
0	-	-
1	3.7	4.4
2	26.2	29.5
3	44.2	49.0
4	42.1	47.1
5	40.0	45.2
6	31.7	36.3
7	29.5	33.0
8+	25.4	28.5
All	27.9	31.5

Education. Unlike the sharp positive relationship between educational attainment and conventional family planning practice, the relationship between education and sterilization is curvilinear, with the highest proportion of sterilized women among those with 1-4 years of schooling. In this group, about 34 percent of the ever-married women and 39 percent of the currently married women were sterilized. Part of the reason why women with more years of schooling were not more likely to be sterilized was that they were using other fertility control methods (Table 7.12). But this alone is not an adequate explanation; a better understanding of the relationship was obtained through the regression analysis summarized below.

Table 7.12 Percentage of ever-married women by family planning method and education, three districts combined, Kerala

Education	Conventional Method			Sterilized	Currently using or sterilized	Never used
	Currently using	Used in the past	Ever used			
No schooling	6.3	6.6	12.9	21.6	27.9	65.4
1-4 years	15.1	15.6	30.8	33.8	49.0	35.3
5-9 years	23.4	18.5	41.8	29.3	52.7	28.8
10+ years	40.3	22.2	62.5	18.5	58.9	18.9
All	18.8	15.3	33.9	27.9	46.8	38.2

Other characteristics. Finally, we studied the variations in the proportion of sterilized couples by per capita household expenditures and ownership of land. With household expenditures, the relationship is curvilinear; women in households with a per capita monthly expenditure of Rs. 50-59, which is in the middle range, are the most likely to be sterilized (33 percent). Very little variation by size of landholdings occurs (see Annex Tables 15 and 16).

Family Planning Methods Combined

Conventional family planning methods and sterilization are alternate means of controlling fertility. If a woman is sterilized there is no need for her to use conventional family planning methods; if she uses conventional family planning methods efficiently, there is no need to resort to sterilization. Both types of practice, therefore, must be considered simultaneously.

About 46.8 percent of all ever-married women surveyed were either sterilized or used a conventional family planning method. In general, the relationship between various socioeconomic factors and both conventional family planning practice and sterilization is similar. For example, the greatest degree of fertility regulation, by whatever means, is seen at ages 30-34 years (Annex Table 17) and among women with three children (Annex Table 18). There are differences, however, when the variable is education (Table 7.12); with conventional family planning methods the relation is positive throughout, but with sterilization it is curvilinear. When both methods are combined, the relationship remains positive. Nearly 60 percent of women with at least ten years of schooling have adopted some form of birth control, compared with 53 percent of those with 5-9 years of schooling, 49 percent of those with 1-4 years of schooling, and 28 percent of those with no schooling.

With respect to age at marriage (Annex Table 14), the positive relationship with conventional methods and the negative relationship with sterilization cancel one another, leaving a flat curve for the two groups combined. Ownership of land is not a relevant factor (Annex Table 16), but per capita household expenditure (Annex Table 15) is. So is caste (Annex Table 19). Scheduled Castes and Ezawas have a comparatively low rate of use of conventional family planning techniques (20-30 percent ever-used), but this is compensated by their high sterilization rate (about 30 percent). Christians have high rates for both types of birth control (50-55 percent have at some time used conventional contraceptives; 27-33 percent are sterilized), while Muslims have low rates (about 20 percent for both conventional methods and sterilization).

In general, the proportion of women practicing birth control who use conventional methods increases with rising socioeconomic status. Use of such methods is more prevalent among women who are better educated, belong to the higher castes, and live in households with more land and greater per capita monthly expenditures.

Factors Related to Family Planning: Regression Analyses

This chapter has examined the variations in family planning practice by age, education, and caste. In this section, we analyze the simultaneous relationship of these factors with the help of multiple regression, thereby identifying and measuring more precisely the impact of those variables that have an independent effect on family planning knowledge and practice (Table 7.13).

Table 7.13 Summary of regression analyses of family planning use (standardized regression coefficients)

Dependent variable	Regression number						
	I	II	III	IV	V	VI	VII
Years of schooling							
Wife	.3179	.2212	.3213	.2038	.2740	.3746	.4733
Husband	.2532	-	-	-	.1537	-	NA
(Years of schooling)^2							
Wife	-.1897	-	-	-	-.2482	-.1995	-.2908
Husband	-.1917	-	-	-	-.1718	-	NA
Land owned (cents)	-	-.0480	-.0508	-	-.0579	-.0718	-.0715
Household expenditures	.0545	.0478	-	-	-	-	-
Age	.6514	.4257	.8938	.3524	1.6980	1.6766	1.7641
(Age)^2	-.6050	-.3505	-.7772	-.4028	-1.5398	-1.4955	1.6924
Caste							.0573
Nair	.0491	.0525	-	-	-	-	NA
Ezawa	.0540	-	-	-	-	.0465	NA
Christian	-	.1855	.2060	-	-	.1228	NA
Muslim	-	-	-	-	-	-	NA
Scheduled Castes (constant)							
Excess fertility	NA	NA	NA	NA	NA	NA	.2140
R^2	.08020	.15527	.16650	.11283	.10019	.14715	.17663

Notes: - the coefficient was not significant at the 95 percent level.
NA not included in the regression

Dependent variables in regressions I-VII

I: Knowledge of family planning methods
0 = does not know any method
1 = knows at least one method

II: Ever-use of conventional methods
0 = never used
1 = used

III: Current use of conventional methods among nonsterilized women
0 = not using
1 = using one or more methods

IV: Ever-use of pills, IUD, or condoms among nonsterilized women
0 = never used
1 = used one or more methods

V: Sterilization
0 = not sterilized
1 = sterilized

VI, VII: Use of conventional methods or sterilization
0 = neither sterilized nor using a conventional method
1 = sterilized or using a conventional method

Knowledge of Family Planning Methods

The wife's education is the principal variable affecting the knowledge of family planning methods (regression I). The total variance explained by all the independent variables together is 8.0 percent, 39 percent of which is attributable to the wife's years of schooling and 11 percent to the square of her years of schooling. The regression coefficients are +0.0275 and -0.00145 respectively. At lower levels of the woman's education, an additional year of schooling increases the knowledge of family planning methods by 2.75 percent. At higher levels, however, the improvement is marginal.

Age is statistically related to knowledge of family planning methods, both linearly and at the second degree. At younger ages and lower parities, there is a positive relationship between knowledge of family planning methods and age. At older ages the relationship is negative; that is, family planning knowledge decreases with age.

As explained earlier, the direct relation at younger ages and inverse relation at older ages are due to two conflicting trends. Family planning is relatively new to Kerala, and younger women with a better education are more likely to know about its methods than older women with less education. At the same time, younger women have less need to acquire knowledge about family planning. The need is greater among older women, who have also been exposed over a longer period to family planning publicity. These conflicting trends together result in maximum knowledge being possessed by women about 37 years of age.

Caste has a significant effect on knowledge about family planning. Relative to the Scheduled Castes, which are the reference group, the Nairs and Ezawas are better informed, while the Christians and Muslims do not show any significant difference. Finally, ownership of land by the household is not a relevant factor in this regard.

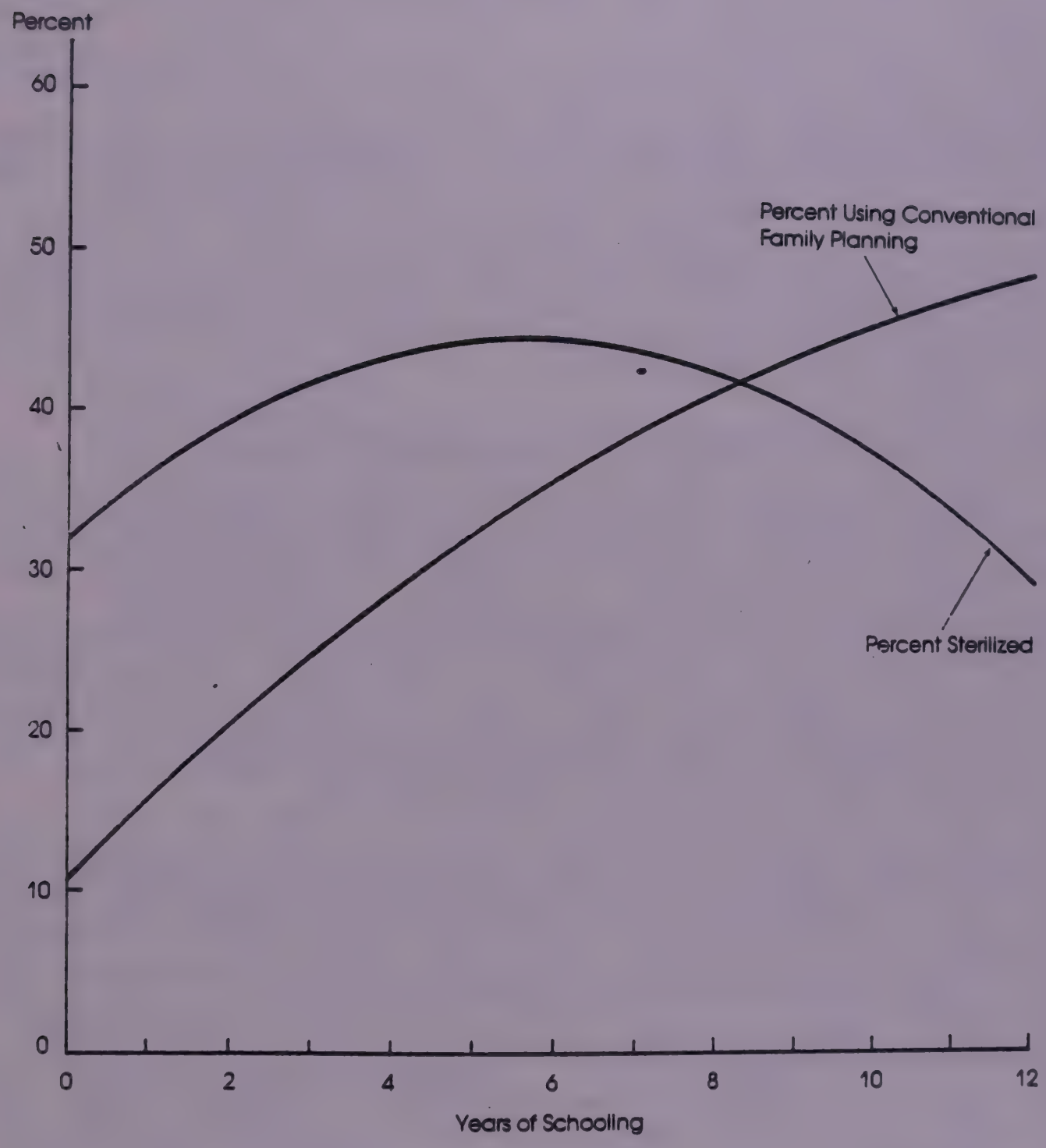
Ever-Use of Conventional Methods

A large number of variables have a statistically significant relationship with the ever-use of any of the conventional family planning methods (regression II). The most important are the wife's education, age, land owned, and caste.

As with knowledge of family planning methods, so their use increases with longer schooling. Education accounts for 46 percent of the total variance explained by all the variables. With the other variables remaining constant, the level of contraceptive use in Kerala at various levels of educational attainment would be as shown in Figure 7.1.

Surprisingly, ownership of land has a negative relation to the use of conventional family planning methods. Additional variables which make a signficant contribution to contraceptive use are age and caste. Age has a positive relationship at younger ages, but a negative one at older ages. Among the various castes, only Nairs and Christians show a significant relationship, which is positive.

Figure 7.1
PARTIAL REGRESSION BETWEEN YEARS OF SCHOOLING AND BIRTH CONTROL PRACTICE, KERALA, 1980



World Bank—24856

Ever-Use of Pills, IUD, or Condoms by Nonsterilized Women

Only two variables have a significant relationship with the use of efficient conventional family planning methods, including pills, IUD, or condoms (regression IV). These are the wife's education and age. For years of schooling the association is linear and positive. For age it is positive at younger ages, but negative at older ages.

Sterilization

Most of the variables except caste and per capita expenditures have a statistically significant relationship with the propensity to get sterilized (regression V). Age has a positive relationship only at younger ages. Sterilization increases with age up to 38 years, after which it starts decreasing. Similarly, education of the wife is positively related to sterilization at lower levels (about six years of schooling), but beyond that level, the more educated a woman, the less her chance of being sterilized (see Figure 7.1). Education of the husband is also positively related to sterilization status up to about six years of schooling only. Land owned is associated negatively with sterilization.

Use of Conventional Family Planning Methods or Sterilization

Two regressions were run: one included excess fertility as an independent variable (dummy), the other did not. When excess fertility is not considered, all variables except the husband's education and per capita household expenditures are statistically significant in explaining contraceptive use (regression VI). Education accounts for 24 percent of the total explained variance, age for 61 percent. When excess fertility status is included in the regression, it assumes major importance in contributing to the explained variance (R^2 = 18 percent, 35 percent of which is due to the excess fertility variable). Education contributes 34 percent of the explained variance, and age 25 percent (regression VII).

The overall conclusion is that, other than age and fertility status, the wife's education is the most important single factor in determining both knowledge and use of family planning methods. Of the total variance explained by the independent variables, education contributed 49 percent to knowledge of family planning methods, 45 percent to ever-use of conventional family planning methods, 45 percent to use of conventional methods by nonsterilized women, but only 12 percent to sterilization. In the latter case, the second degree negative relationship is more prominent than the first degree positive relationship (11.5 percent versus 0.02 percent). The overall level of R^2 is low, varying from 8 to 18 percent. Thus, there are quite a number of other factors which determine whether a woman uses a contraceptive or whether she or her husband is sterilized. These may not be socioeconomic factors at all, but rather program-related factors.

Reasons for Not Using a Contraceptive

A direct question about the reason why women were not using a contraceptive revealed that there were still some couples in Kerala who disapproved of family planning methods. This was the case for 8.4 percent of the women surveyed and 18.4 percent of their husbands (Table 7.14). Only 3.3 percent of the women, however, gave lack of knowledge about the availability of family planning services as a reason for not practicing family planning. Thus, the major obstacle to increased use of contraceptives in Kerala seems to be a lack of demand rather than a lack of knowledge about methods or facilities.

Table 7.14 Reasons for not using contraception, three districts combined, Kerala

Reason	Percentage of women
Husband disapproves	18.4
Wife disapproves	8.4
Never heard of family planning	2.0
Does not know where to go for services	3.3
Wants another child	23.5
Believes that wife cannot conceive	13.6
Other reasons	30.8

Family Planning Use and the Fertility Decline

With about half the currently married women either sterilized or using a conventional family planning method, family planning should have a significant impact on fertility in Kerala. What is the actual contribution made by family planning to Kerala's fertility reduction?

The distribution of women by family planning and marital status is given below:

Total women, 15-49 years	1,000
Never married	379
Widowed, divorced	69
Pregnant	7
Sterilized	174
Using conventional family planning	117
Exposed to pregnancy	254

All but 25.4 percent of the women surveyed were protected from pregnancy, if those who used conventional family planning methods used them efficiently. This does not necessarily mean, however, that all but 25.4 percent of births were averted, as fertility rates are not the same at all ages. The relative contribution of the various factors to birth control is shown in Figure 7.2. The age-by-age analysis does not change the conclusion substantially; the proportion of births averted is more or less equal to the proportion of women protected. Summary results are reproduced below:

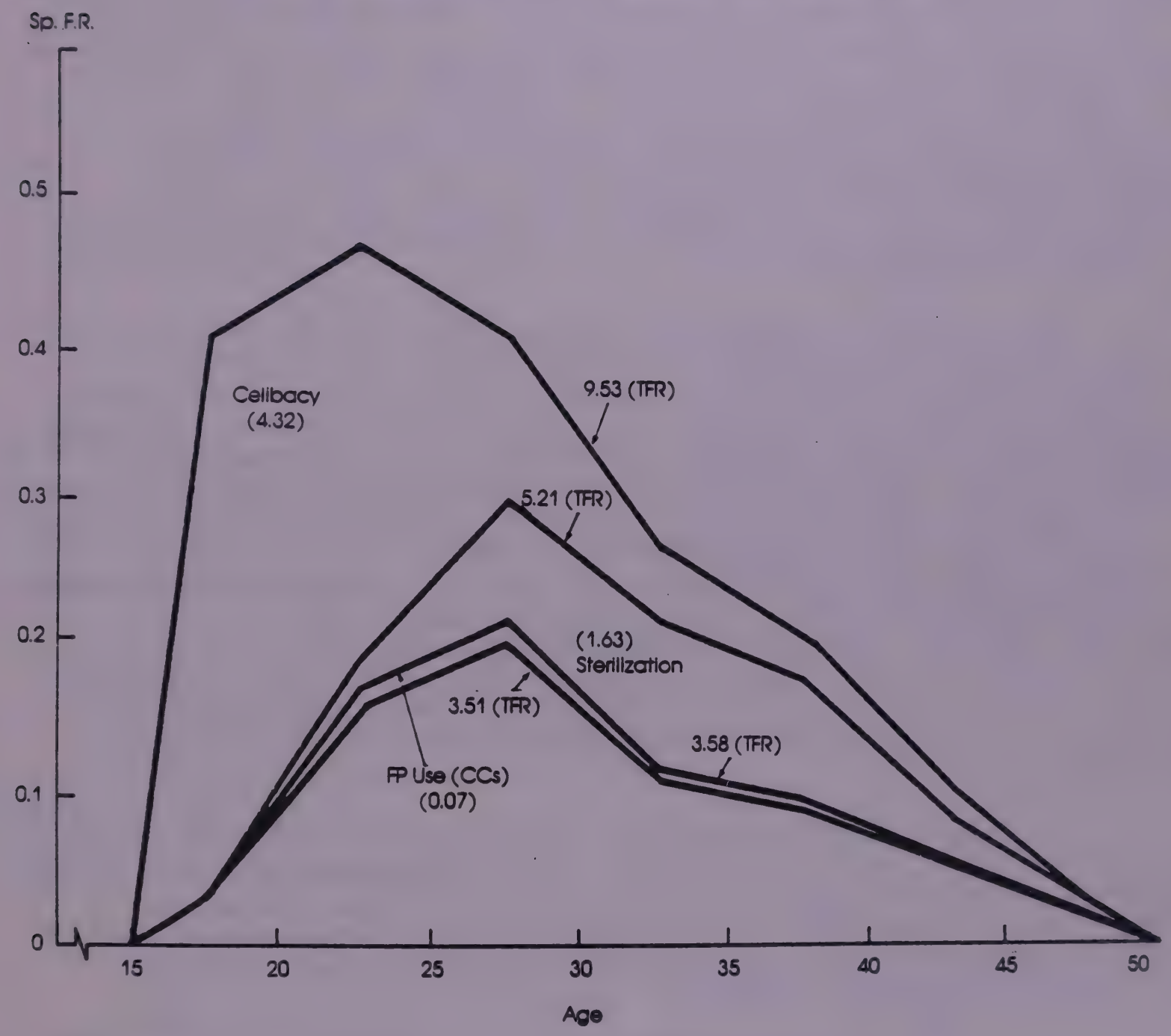
			Balance	
Total potential fertility rate	9.53	100%		
Reduction due to celibacy, widowhood, divorce, etc.	4.32	45	5.21	55%
Reduction due to sterilization	1.63	17	3.58	38
Reduction due to family planning				
assuming 100 percent efficiency	1.14	12	2.44	26
assuming realistic efficiency	0.07	0.7	3.51	37

If family planning were 100 percent efficient, then the total fertility rate in Kerala in 1980 would have been about 2.44. But the actual rate was higher. Conventional family planning has not been totally effective in controlling births, although it may have been somewhat useful in postponing them.

Earlier we estimated that the effect of there being 502 conventional family planning practitioners was equivalent to that of 30 sterilizations. If this is correct, then conventional family planning practice should have resulted in a reduction of 0.04 (30/746) times the reduction due to sterilization, or 0.07, in the total fertility rate. This would mean an estimated total fertility rate of 3.51 for 1980.

Thus, Kerala's potential fertility rate was reduced by 63 percent, of which 45 percent was due to celibacy, delayed marriages (at ages above 15 years), widowhood, and so on, and 18 percent to sterilization and conventional family planning methods. While most of the effect of sterilization and family planning took place during 1970-80, much of the effect of the nuptiality factor took place earlier. The increase in age at marriage, however, continues to be an important factor in Kerala's fertility decline.

Figure 7.2
Potential Fertility Reduction Due to Celibacy, Sterilization, and Family Planning Use, Kerala, 1980



Note:
Figures in parentheses are the potential reduction in TFR due to that factor.
This is equal to the area between the curves.

World Bank—24745

Part Three. Interpretations and Conclusions

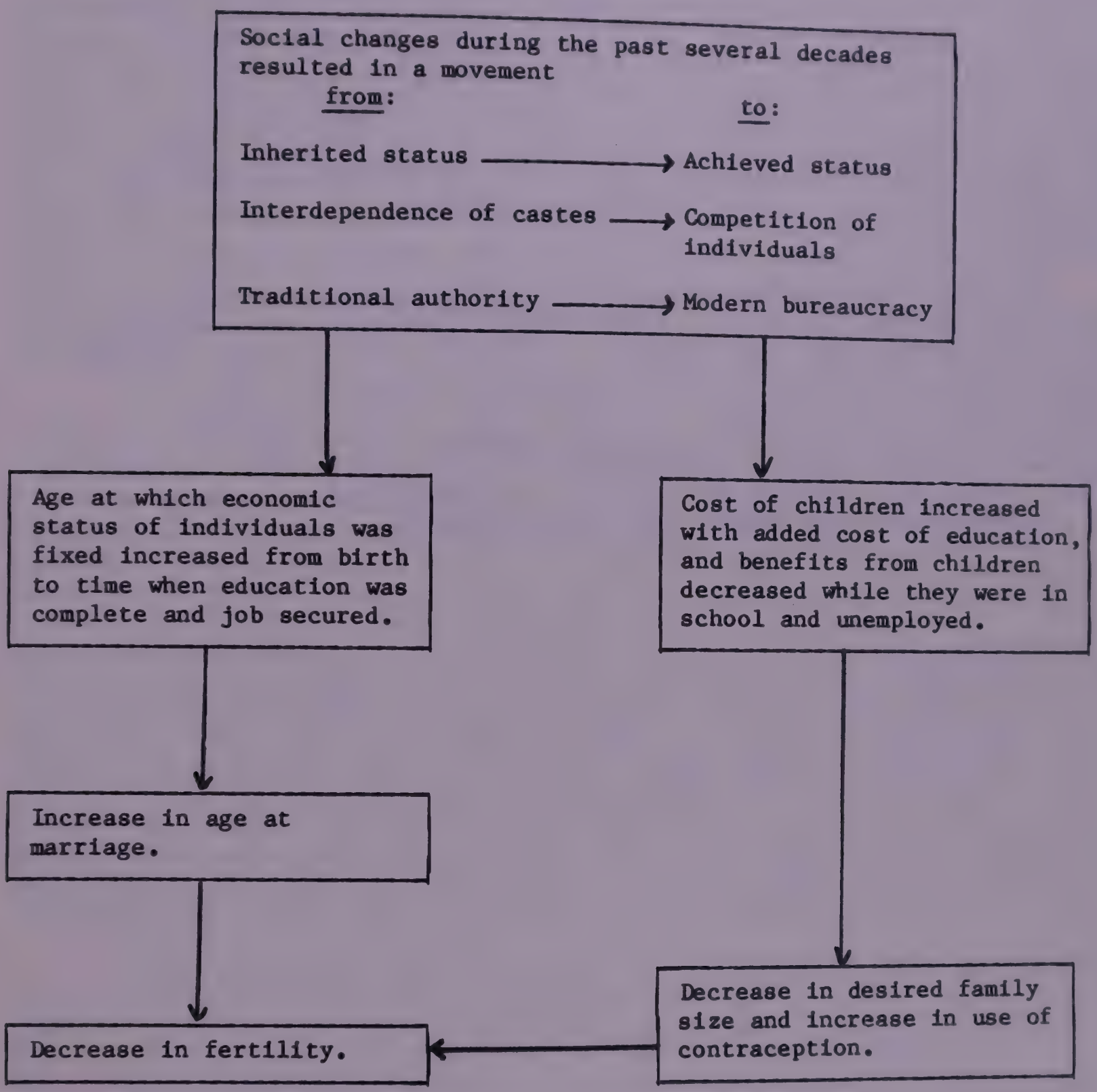
This study of the reasons for the recent steep fertility decline in Kerala assumes that decisions about family building -- whether, when, and whom to marry; whether, when, and how many children to produce -- are strongly influenced by the perceived economic advantages and disadvantages involved. Kerala's fertility has declined, according to this hypothesis, in large part because children have become increasingly costly, while the benefits from them have not kept pace with the higher costs. The gradual rise in the cost of bringing up children is the result, in turn, of improvements in health and education -- health, because the number of children surviving to be raised and educated has increased; education, because the level of education necessary for economic survival and consequently the actual years of schooling have increased sharply among all segments of the population.

The low level of infant and child mortality and the high level of educational aspirations and attainments have combined to provide an environment in Kerala conducive to a decline in fertility. But the ground was prepared by certain other significant reorientations as well. An acute shortage of land has forced more and more youngsters to seek employment outside the primary sector. This, and the introduction of formal education as a criterion for admittance to public service, brought about a basic change in the society after centuries of fundamental stability. It became, so to say, unhinged, ushering in a movement away from inherited to achieved status, from interdependence of castes to competition of individuals, from traditional authority to modern bureaucracy. Religious groups and caste groups competed with each other to provide the best educational facilities for their members; parents and relatives spared no available resource, neither time nor money, to provide their children with the best education they could afford.

A schematic diagram of how this transition could have induced a fertility decline is found in Figure 8.1. Given the fundamental shift in the workings of the society, children of higher quality became not merely desirable but even necessary. The increased cost of raising each child, and the greater number of children surviving to adulthood, caused couples to revise downward the number of children they wished to have.

The downward trend in desired family size would be expected to affect actual family size, and it did. It is nevertheless doubtful whether the recent sharp decline in marital fertility, which embraced all socioeconomic groups, could have been caused solely by a long-term, gradual change in attitude. More likely, it was precipitated by specific policy interventions. Land reforms and agrarian reforms accelerated the reduction in desired family size already underway. The official family planning program, gathering momentum at a very opportune time, helped to translate this wish to decrease fertility into an actual fertility decline.

Figure 8.1 Impact of Social Reforms on Fertility in Kerala


Social changes during the past several decades resulted in a movement
from:
to:
Inherited status → Achieved status
Interdependence of castes → Competition of individuals
Traditional authority → Modern bureaucracy
Age at which economic status of individuals was fixed increased from birth to time when education was complete and job secured.
Cost of children increased with added cost of education, and benefits from children decreased while they were in school and unemployed.
Increase in age at marriage.
Decrease in desired family size and increase in use of contraception.
Decrease in fertility.

In Kerala, as in most other populations, fertility has declined not only through family planning and the resultant drop in marital fertility, but also through later marriages. In the case of the three districts surveyed, roughly 31 percent of the fertility decline between 1965 and 1980 was due to a decline in the proportion of women married, most notably in the 15-19 and 20-24 year age groups. Whereas marrying early was long perceived as economically advantageous, this is no longer the case. The factors responsible are basically the same ones that account for the decline in marital fertility, although they are manifested in different forms. Education, in particular, plays a major role not only directly through increased years of schooling, but also indirectly through its impact on employment, occupation, dowry, housing, and attitudes about marriage and a marriage partner.

Because the factors leading to a delay in marriage and to a reduction in marital fertility are very similar, there is some unavoidable overlap in the following two chapters. We consider first the more limited hypothesis about the factors affecting age at marriage, then turn to a broader review of the determinants of fertility. In both chapters, a presentation of the theoretical framework precedes a close analysis of the evidence available from the survey data. A final chapter draws together some of the lessons to be learned from Kerala's experience and attempts to point the way to some fruitful avenues for further research.

Chapter 8. Determinants of Age at Marriage

Nearly all healthy women in Kerala are either married or intend to get married. But the age at which these women marry is relatively high compared to other States of India. This phenomenon is not new; it has been shaped by a variety of cultural and historical forces, and has persisted for many years. Our concern here, however, is not to explore the traditional reasons for the disparities between Kerala and India in this respect. It is rather to measure the recent increase in age at marriage in Kerala, and to determine which are the principal socioeconomic factors that explain why women are not marrying as early as they used to. These factors, as has been noted, are not very different from those underlying an increase in family planning practice, to be discussed in Chapter 9. There are, nonetheless, important differences in timing; socioeconomic factors affected age at marriage first, even before they had any perceptible impact on marital fertility.

Conceptual Framework

Among most communities in Kerala, marriages are arranged and represent economic and social contracts between two families rather than personal agreements between a boy and a girl. In these contracts, the social status and lifetime income of the boy and girl (and their families), but particularly of the boy, have been and still are very important considerations. Before, it was relatively easy to estimate status and income and thus contract a marriage even when the boy and girl were very young, as these attributes depended on ascribed position and inherited wealth, especially land. Land is no longer the principal source of status and income, however; today these are acquired through one's education and career. Thus, the economic value of young people can be realistically assessed only after they have completed their studies and found a job. So marriages are often delayed until then. In a period when both the length of schooling and the time lag between finishing school and securing a job are increasing, the age at marriage is likely to continue to rise.

Not all boys and girls are still in school at 15 or 16; many have already completed their formal education by that age. While a slight increase in the number of years that young people are in school does not directly affect their age at marriage, it can do so indirectly through changes in attitude toward marriage. Moreover, how people will earn a living after leaving school is often not clear until they reach the age of 20 or more. Finally, apart from these factors, there have been other economic reasons for delaying marriage in recent years.

One such reason involves the dowry system common in most groups in Kerala. The amount of dowry, in cash and kind, has increased considerably in relation to household assets, reflecting the increasing cost of educating a son and assuring his employment. In the past much of the dowry came from inherited wealth; today the sum usually comes from savings and/or borrowings. As a result, marriages must be delayed until the girl's parents can amass sufficient funds or creditworthiness to satisfy the bridegroom's family. For a boy, his chance of recieving a good dowry is much brighter when his economic worth is fully manifest, that is, when he completes his

Young couples' views on housing arrangements after marriage are also changing. Newlyweds used to live with either set of parents, but many, especially among the educated, now prefer some other arrangement. Moreover, as more young people work at a distance from their parents' home, separate housing becomes a necessity. Whether out of choice or necessity, housing can become an important consideration in deciding when to marry. In urban areas, housing problems are caused by shortages and by rents that are beyond the means of the lower and middle classes. In rural areas, they are caused by shortages of land and by changes brought about by land reform. Formerly, landless persons were able to build a hut on a wealthy neighbor's land without much difficulty. This arrangement was mutually beneficial; the landowner got a watchman to look after his land and crops, while the landless person got a place to stay rent-free. This alternative is now less readily available because land is scarce, while the land reform laws make it difficult for the wealthy neighbor to get back his land when he needs it. Among both rich and poor, then, problems related to housing tend to delay marriage.

Marriage decisions are often made by the parents, particularly the fathers. This is changing, but as the present survey has shown, most of the decisions are still made by the parents. It may be economically advantageous for a father to delay his son's marriage, since by doing so he retains the use of his son's wages for family expenses and saves himself the difficult problem of finding housing for the newlyweds. Before, when children were not in school, they could contribute to family income at a young age. Now they do so only at an older age after they have finished their education.

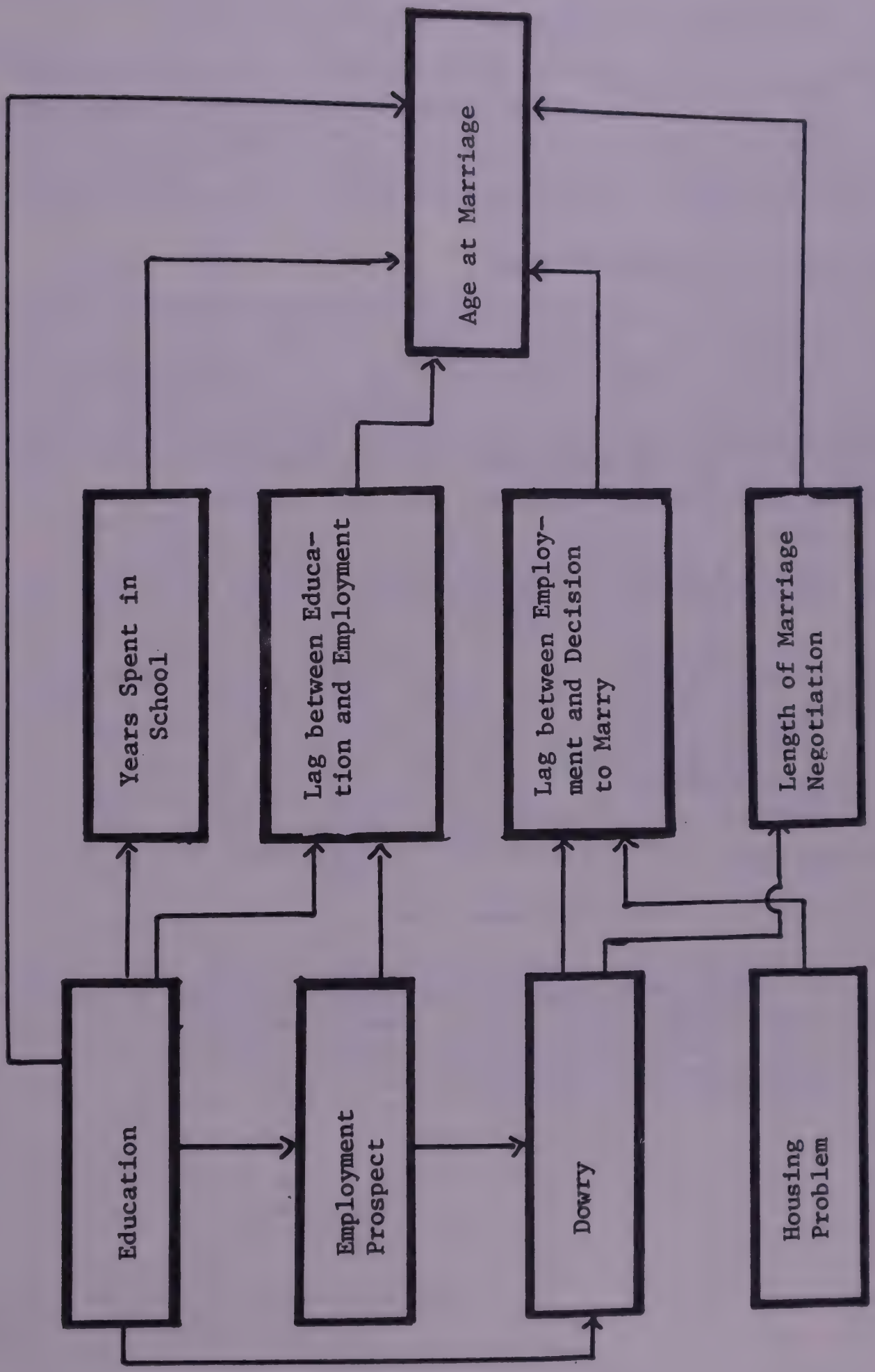
Marriage decisions, then, are made mostly on the basis of perceived economic advantage and disadvantage, not only to the couple, but also to the parents. In the past, assessments could be made relatively easily when the boy and girl were still quite young. But as the economic basis for marriage decisions has shifted from land and other inherited resources to education and other acquired assets, the average age at marriage has edged upward.

A schematic representation of the relationship between age at marriage and the socioeconomic variables enumerated above - education, employment, dowry, and housing - is given in Figure 8.2. These variables affect the components that enter into the timing of when people marry, including not only the number of years in school, but also the lags between schooling and first job, between first job and the decision to marry, and between that decision and the completion of the marriage negotiations. As any or all of these time spans increase, so of course does the age at marriage.

Empirical Evidence

In order to determine the validity of this conceptual framework regarding age at marriage, the various possible explanatory factors have been tested for relevance using data collected as part of the fertility survey. The remainder of this chapter will analyze to what extent the available evidence supports each of the following hypotheses:

Figure 8.2 Determinants of Age at Marriage



- Marriage decisions are most often made by parents.

- Economic considerations play a major part in marriage decisions (partly as a consequence of the parents' role).

- The recent increase in age at marriage of girls is mostly due to the lengthier education needed to equip young people for economic survival; the longer time lag between finishing school and starting to work caused by unemployment problems; the larger dowry demanded by the groom's family; and the growing housing problem.

Who Makes Decisions about Marriage

All ever-married women were asked whether their marriage decisions were made by themselves, by their parents, jointly, or by others such as uncles or brothers. Their answers indicate the overwhelming role played by parents in this matter (Table 8.1). Marriage proposals are initiated by parents and acted upon by them. During this process parents consult their daughter (or son) and often take the young person's views into consideration, but the final decision is theirs.

Table 8.1 Who made decision about first marriage, three districts combined, Kerala

Decisionmaker	Number	Percentage
Parents alone	2,399	89
Parents and couple	186	7
Couples alone	77	3
Other	31	1
Total	2,693	100

The proportion of marriages decided upon mainly by parents (about 90 percent) remained fairly constant by year of marriage, indicating little change over time. Among educated women, however, more and more marriages are planned by couples and parents jointly (Table 8.2).

Table 8.2 Who made marriage decision by education of the bride, three districts combined, Kerala

Education	Parents alone	Parents and couple	Couple alone	Others
No schooling	91.6	4.0	2.9	1.5
1-4 years of schooling	88.0	6.1	4.1	1.8
5-9 years of schooling	88.7	7.6	2.2	1.5
10+ years of schooling	85.0	13.5	1.5	0.0
All ever-married women	88.8	6.9	2.9	1.4

Reasons for Marrying Late

All never-married women were asked whether they intended to marry; if they did they were then asked what was their intended age at marriage and why they did not intend to marry earlier. Nearly all women (699 out of 736 or 95 percent) answered that they would marry sometime in the future. Of the few who said they would not, most were handicapped (21 out of 37). The reason women gave for not having yet married or for not intending to marry before a certain age are summarized in Table 8.3.

These answers were elicited on the basis of an open question. Undoubtedly most never-married women delayed their marriage for economic reasons. Either they were unable to get a marriage offer from an economically secure boy, or they did not want to jeopardize their own educational and employment opportunities by marrying too early. Noneconomic reasons (such as waiting for a sister to get married) were cited occasionally, but in most cases they too could be traced to some economic motivation.

Table 8.3 Reasons for not marrying earlier than intended, never-married women, three districts combined, Kerala

Reasons	Number of women	Percentage
Economic security	327	47
Expecting a job	113	16
Waiting to complete education	79	11
No desire to get married at too young an age	70	10
Waiting for sister to get married	64	9
Family obligations	13	2
Other	33	5
Total	699	100

Thus, the first and second hypotheses of our conceptual framework are well founded--parents make most of the decisions about the marriages of their children, and the basic factors underlying these decisions are economic in nature. We shall now consider in some detail the various economic factors believed to influence marriage decisions.

Education. Whether, when, and whom to marry are all undoubtedly affected by a woman's level of education. Educated women marry later than illiterate women (a difference of 7.2 years among those who married before 1960, and of 2.7 years among those who married in 1975-79; see Chapter 6). Education is a principal determinant of age at marriage even when other socioeconomic factors are taken into consideration. Additional data on "best" age at marriage as reported by both married and unmarried women, and on intended age at marriage among the unmarried, are given in Table 8.4.

Table 8.4 Regression between education of woman and age at marriage

Dependent variable	Standardized regression coefficient	F-value	R^2
Age at marriage of married women	0.3070	127.6	15.2
Best age for girls to get married as stated by married women	0.2663	105.8	23.2
Intended age at marriage of never-married women	0.0833	7.4	53.3
Best age for girls to get married as stated by never-married women	0.3281	61.3	14.4

All the regression coefficients are highly significant and positive. The education variable accounts for a large proportion of the variation in the desired, or best, age at marriage (39 percent of the explained variance in the case of married women, and 54 percent in the case of unmarried women). Educated married women have a much older desired age at marriage, and they marry at an older age. Similarly, educated unmarried women have a much older desired age at marriage, and they intend to marry at an older age. This confirms the fact that education is a major, perhaps even the most important, determinant of age at marriage. The effect persists not only through a longer period of school attendance, but also through later changes in occupation, affecting attitudes toward a marriage partner, toward age at marriage, and so on.

Employment. Data to test the relevance of employment as a determinant of marriage were generated by two questions. The first pertained to the employment status of husbands at the time of marriage. The second, addressed to both married and unmarried women, asked whether they would agree to marry a boy without a job if he was acceptable in all other respects.

Most women (95 percent) were married to men who were employed or had other means to support a wife at the time of marriage. The regression between age at marriage and the dummy variable "employed or unemployed" (along with education and other socioeconomic variables) gave a statistically insignificant coefficient. Women who married men without a job did not have an average age at marriage different from that of women who married men with a job.

Married women whose husbands had a job or other means of support at the time of marriage were asked further whether they or their parents would have agreed to the marriage if the boy did not have a job. A similar question was asked of never-married women. The negative answers given by these two groups (88 percent and 78 percent respectively) show that the women were overwhelmingly against marrying an unemployed person (Table 8.5). The regression for married women between age at marriage and attitude toward marrying an unemployed male was statistically significant; that for unmarried women between intended age at marriage and attitude toward marrying an unemployed male was not.

	Age at marriage, married women	Intended age at marriage, unmarried women
b =	+ 0.2780	0.1596
B =	+ 0.0376	0.0269
F =	4.1	1.0
R^2 =	23.2	53.3

Table 8.5 Opinion of married and unmarried women about marrying a boy without a job, three districts combined, Kerala

Answer	Married Number	Married Percentage	Unmarried Number	Unmarried Percentage
Respondent and parents would have agreed	269	11.9	157	21.6
Respondent alone would have agreed	36			
Parents alone would have agreed	46	88.1	569	78.4
None would have agreed	2,217			

The age at marriage of married women who said they would not marry an unemployed boy was significantly lower (by five months) than that of women who said they would not mind marrying such a boy. It is possible that a woman's age at marriage has influenced her answer to this question instead of her attitude about marrying an unemployed male affecting her age at marriage.

Among unmarried women, on the other hand, there is no significant association between intended age at marriage and opinion about marrying an unemployed boy. The proportion of women who would have married someone unemployed is higher among the unmarried than among the married (22 percent versus 12 percent). The fact that more women who married late than early, and more women who were unmarried than married, would have accepted a spouse without a job, indicates that strict conditions for selection of a marriage partner are progressively relaxed as marriage is delayed further and further beyond the desired (best) age.

Dowry. The dowry system continues unabated in Kerala, despite the fact that the practice was made illegal in 1961. Many marriages are delayed or cancelled because of dowry problems.

For the married women surveyed, the average dowry was about Rs. 6,900. It was higher for the currently married than for the widowed; higher for the younger women than for the older ones; and higher for the educated than for the illiterate, as shown in Table 8.6.

Table 8.6: Dowry of married women by education, three districts combined, Kerala

Education	Dowry
No schooling	2,900
1-4 years of schooling	4,800
5-9 years of schooling	8,800
10+ years of schooling	15,500
All women	6,900

Never-married women were asked how much dowry they would be expected to pay if they were to marry the boy of their choice. The average expected dowry was almost twice the average dowry of those married (Rs. 12,200 compared with Rs. 6,900). Only a small part of this difference is due to variations in the age distribution (the standardized average for married women, using the age distribution of the never-married as the standard population, was Rs. 7,100).

The average age at marriage is higher among those who have given larger dowries, but the regression between age at marriage and bride's wealth is not statistically significant (Table 8.7). The association between best age to marry and dowry is, however, significant and positive: the less the dowry, the lower the age deemed best for girls to get married. One reason for the nonsignificant relationship between dowry and age at marriage may be the way the dowry variable is defined. The regression used the amount of dowry actually given by the married, and the amount expected to be given by the unmarried. The potential of insufficient funds or goods was not measured; yet it is the unavailability of dowry which would hamper the fulfillment of a marriage.

Table 8.7 Regression between dowry (actual or expected) and age at marriage

Dependent variable	Standardized regression coefficient	F-value	R^2
Married women			
Actual age at marriage	0.0311	1.6 a/	15.2
Best age at marriage	0.1155	24.9	23.1
Unmarried women			
Intended age at marriage	- 0.023	0.6 a/	53.3
Best age at marriage	0.041	1.0 a/	14.4

a. Statistically insignificant.

Fortunately, a further question used in the survey captures this aspect of the dowry problem. Married women were asked if their marriage was delayed because the needed dowry could not be raised. About 7 percent answered in the affirmative; they would have been married earlier if their parents could have given the dowry asked for by the prospective bridegroom. The problem was greatest among women of average education (Table 8.8).

Table 8.8: Proportion of ever-married women by education whose marriage was delayed due to dowry problems, three districts combined, Kerala

Education	Percentage
No schooling	6.2
1-4 years of schooling	10.5
5-9 years of schooling	5.9
10+ years of schooling	1.8
All women	6.9

The never-married women were asked a slightly different question: would their marriage be delayed or cancelled if their parents could not raise the necessary bride's wealth. About half the women (48 percent) said the marriage would be delayed, and the rest said it would be cancelled altogether. This gives some indication of the importance of dowry in postponing marriage. It is quite possible that a large proportion of the never-married women in the sample were not married because their parents could not come up with the needed dowry. While this direct question was not asked, the answers to the hypothetical question indicate that many of the older unmarried women had remained unmarried because of the dowry problem (about 40 percent).

Housing. A question about living arrangements during the first year of marriage yielded fairly uniform answers. Most couples (83 percent) lived with the husband's parents (Table 8.9). The proportion who lived by themselves was only about 6 percent of the total, but 11 percent of the well-educated. Of the never-married women, 96 percent replied that newly-married couples usually live in the husband's household.

Table 8.9 Proportion of married women by place of residence during first year of marriage and education, and of never-married women by opinion about place of residence after marriage, marriage, three districts combined, Kerala

Place of residence	Married women by years of schooling					Never-married women
	None	1-4	5-9	10+	All	
With husband's parents	85.6	82.7	83.4	75.3	82.9	96.4
With wife's parents	10.0	12.2	9.4	13.1	10.8	1.4
Couple by themselves	4.2	4.6	6.3	11.3	5.8	1.4
Other	0.2	0.5	0.9	0.4	0.5	0.8

The few women who answered that they and their husbands lived by themselves immediately after marriage were asked further whether they would have married when they did had there been no housing available for separate living. Most of them would have done so. Of the eleven never-married women who were asked this question, nine answered that they would not postpone marriage for this reason (Table 8.10).

Table 8.10 Distribution of women by marital status and opinion about postponement of marriage if separate housing not available, three districts combined, Kerala

Postponement of marriage	Never married		Married	
	Number	Percentage	Number	Percentage
Yes	2	18	34	13
No	9	82	123	87

Those women who would have postponed marriage had no separate housing been available were about a year older than those who answered otherwise. For some women, therefore, housing has been a factor in their age at marriage.

Actual and Desired Age at Marriage

Finally, the women were asked about the best age for girls in a family like theirs to marry. If these "best ages" prove higher than the actual age at marriage for recent years, then our contention that economic problems have caused an increase in age at marriage rests on flimsy ground, at least for the majority of women. On the other hand, if women are marrying later than they think is best, then this argument gains greater credence. The available data are presented below.

Average age at marriage	
- all women married in 1970-74	19.7
- all women married in 1975-80	20.7
- all women aged 25-29 years	19.6
Average best age at marriage for girls	
- as stated by all married women	19.4
- as stated by married women aged 20-24 years	19.1
- as stated by married women aged 25-29 years	19.6
Average intended age at marriage for girls	
- as stated by never-married women	22.6
Average best age at marriage for girls	
- as stated by never-married women	20.3

For married women the best age to get married is only slightly less than the actual age at marriage; the difference has little significance. For never-married women, however, the intended age at marriage is very much higher than the best age. The delay in marriage in this group is apparent.

These averages tend to hide a good deal of useful information. Table 8.11, based on a bivariate distribution, shows that 42 percent of the married women married at an age higher than their desired age. Similarly, nearly 45 percent of the never-married women intend to marry at an age higher than their desired age.

Table 8.11 Distribution of women by actual or intended compared to best age at marriage, three districts combined, Kerala

Category [a]	Married [b]		Never married	
	Number	Percentage	Number	Percentage
Actual/intended age at marriage higher than best age	403	42	334	45
Actual/intended age at marriage equal to best age	143	15	112	15
Actual/intended age at marriage lower than best age	412	43	299	40

a. Actual age for married women; intended age for never-married women.
b. Those married since 1970.

This analysis confirms that a very large proportion of women are getting married later than they consider to be ideal. The delay is evident among both married and never-married women, but is particularly significant among the never-married. Obviously not all of these women are remaining unmarried because they wish to wait until they are older.

The survey data indicate, then, that all four factors selected for limited empirical testing had some share in delaying marriage. Education had an all-pervasive effect, direct and indirect, on actual, intended, and desired age at marriage. Employment is emerging as a prerequisite to marriage; most women would rather delay their marriage than marry someone who is unemployed. Since unemployment among the educated is high, quite a number of marriages are indeed postponed. Dowries are another source of delay, as they increase in keeping with the rising cost of educating a boy and securing him a job. One out of every two never-married women thought that her marriage would be cancelled if she could not raise the dowry demanded by the prospective bridegroom. Housing was the least important of the factors considered, at least up until 1980. Most women did not object to living with the husband's parents after marriage, and very few never-married women would jeopardize their marriage chances because the prospective bridegroom could not find separate housing for the newlyweds. Still, as education increases, this problem is likely to gather strength, since the trend appears to be in the direction of well-educated women being less willing to live with parents.

This chapter did not deal with the "marriage squeeze"-- a demographic gap between the sexes--as a possible cause of increases in the age at marriage. The 1971 census of Kerala shows an imbalance in the number of men and women of marriageable age (1,210,000 females aged 15-19 compared with 978,000 males aged 20-24; and 980,000 unmarried females aged 15-19 compared with 807,000 unmarried males aged 20-24). These data are not enough for a meaningful analysis, however, and the additional data required -- such as on Kerala migrants outside the State -- are not readily available.

Chapter 9. Determinants of Fertility Decline

Conceptual Framework

In the preceding chapter we have underscored the major part played by economic considerations in decisions about whether, when, and whom to marry. The general hypothesis followed in this research suggests that economic considerations are equally powerful determinants of whether, when, and how many children to produce. Just as the increase in age at marriage observed in recent years in Kerala is due to the perceived disadvantages of the past practice of marrying early, so the decrease in marital fertility is due to the perceived disadvantages of raising a large family -- given the changed economic and social situation in the State.

As a general hypothesis, few can find fault with this framework. The difficulty comes in trying to specify what economic advantages or disadvantages are associated with what socioeconomic changes and for which segments of the population.

Ratcliffe, writing in 1978 on social justice and the demographic transition in Kerala, concluded:

> As education and income levels rose as a consequence of distributive policies, fertility and mortality declined in response. As viable investment opportunities other than children and occupational opportunities other than child-bearing became available, fertility declined in response. As the political economy was transformed from one founded on exploitation of the many by the few to one which began increasingly to assume welfare functions traditionally fulfilled by children, fertility declined--and continues to decline--in response. (p. 140)

According to Ratcliffe, the major cause of fertility decline in the State was the improvement in the level of living of Kerala's poor. In other words, fertility and income are negatively related; as the income of the majority of the poor increased, their fertility decreased. Furthermore, since the poor constitute a large proportion of Kerala's population, any decrease of fertility among them was reflected in the State's average rate. Ratcliffe gives much credit to the political situation, to the social and economic reforms brought about by the successive governments, and to the social justice which resulted from these reforms. He does not give any special credit to the family planning program, seeming to imply (although he does not say so explicitly) that much of the fertility decline would have taken place even without the official program.

In a recent article on "The Lessons and Non-Lessons of Kerala." Mencher (1980) expresses a different point of view.

> ...the decline in fertility among agricultural laborers need not be seen as an indication of any improvement in their quality of life. In the Kerala context, it can equally well be seen as a sign of greater poverty. (p. 1787)

There is some element of truth in what both Ratcliffe and Mencher say. Redistributive policies did play a part in Kerala's fertility decline; at the same time, some of this fertility decline may be characterized as "poverty induced" or, more correctly, as the result of a decrease in income. But this is not the whole story.

We believe the changes in fertility rates are due as much to historical developments as to recent policy interventions. Historical developments prepared the ground whereby a reduction in fertility became not only possible, but also beneficial to most families. Still, these developments by themselves would not have produced either the type or the degree of fertility decline that took place in the State over the past fifteen years. Recent policy interventions also played an essential role.

From Inherited to Acquired Status

The historical developments that lay behind the fertility decline were numerous; but for analytical purposes, they may be characterized in essence as a systematic erosion of the economic significance of a person's inherited characteristics (his religion, caste, family ties) and the simultaneous enhancement of the economic significance of his personal attributes (education, training, experience, health). As Jeffrey writes in The Decline of Nayar Dominance (1976):

> In the last half of the 19th century a society which had survived fundamentally unchanged for 700 years came unhinged. A movement from inherited to achieved status began, a movement from the interdependence of of castes to the competition of individuals, from traditional authority to modern bureaucracy. (p.267)

One good illustration of this transition may be seen in the changing criteria for admission to the government service of the former Travancore and Cochin States. Government service has been and still is one of the most coveted occupations in the State. Earlier, these services involved not only the usual responsibilities such as law and order and tax collection, but also administration of temples and related responsibilities. As non-Hindus and low-caste Hindus were not allowed in Hindu temples, government service was restricted to high-caste Hindus--Brahmins and Nairs in particular. Among the high-caste Hindus, those who were close to the Maharajah had a much greater chance of obtaining such service. Educational attainment or other personal attributes were secondary to inherited characteristics. This practice began to change with the expansion of the government's responsibilities away from temple-related functions to new areas such as education, health, public works, and so on; with the introduction of a minimum educational qualification for entry into government service; and with the overall bureaucratization of the administration. Today the transition is almost complete. A person's chance of getting into government service depends almost entirely on acquired attributes--education, training and experience, health, and the like. A young person's lifetime income is determined more by these than by the caste to which he belongs, or the family into which he was born, or the land or other assets he owns or will probably inherit.

The transition from inherited to achieved status began with the British influence on the administration of Tranvancore and Cochin States, and with the development and spread of education and medicine by the foreign missionaries. The local Christians, who were closer to the missionaries than were the other communities, benefited most from these changes. Through education, they began moving up the social and economic ladder. But the other communities were not far behind; realizing the economic benefit which the Christians were receiving from formal education, they began establishing schools and hospitals for their people. The result was a healthy competition among various groups and a rapid improvement in education and health in the State as a whole. Unlike other parts of India where interreligious and intercaste rivalries led to death and destruction, communal rivalry in Kerala produced social progress and individual liberation.

> "Take away communal spirit and you will kill communal individuality, reduce all communities to one level and retard progress." (Dewan Roghaviah, quoted in Ayar 1923)

Costs and Benefits of Children

Granted that such a transition took place in Kerala, how did it induce a fertility decline? Chiefly through changes in the cost of children relative to the family's income (see Figure 8.1). In the changed economic perspective, children of higher quality became not merely desirable, they became essential for upward social mobility and even for sheer economic survival, both for the well-to-do are for the poor. Formerly the children of the rich could fall back on the family's land or connections to make a decent living and maintain their status in the society. This is no longer possible. Lacking an adequate education, a person cannot make a living on the basis of caste or religion or from land alone. For the poor and those of low caste, education offers the only hope of getting out of the circle of illiteracy, poor health, and poverty. With the recent political changes, and with all the social and economic reforms favoring them, the poor see a chance to improve their lives. Education is a key prerequisite.

Education has become cheaper as high schools and even colleges have opened up within commuting distance of most people. The highly subsidized and widely available transport system enables most children to pursue a higher education while living at home. Although education has become cheaper, those less well off are now spending more on education than previously. There is a simple explanation for this apparent paradox. In the past, education was expensive so few in the lower class could send their children beyond primary school, which was always free. Now that the cost of education has fallen, many in the lower classes are taking advantage of the new opportunities. Their expenditures on education have therefore increased.

Rich and poor parents alike, desiring and needing higher quality children, are spending more money on each child's education, food, clothes, and medical care. But even without any change in the cost per child, the total cost to a family of bringing up children would have increased because of the decrease in infant and child mortality. Ninety percent of the children born today survive to adulthood. Assuming a constant fertility level, a family is faced with educational and other expenses for a larger number of surviving children.

On the benefit side, a distinction has to be made between short-term and long-term benefits. Child labor was never very common in Kerala, and in recent years it is thought to have disappeared altogether.[1]/ As children began spending longer and longer periods in school, their economic contribution to the family became less and less. Even without taking increased schooling into account, the short-term economic benefit of children has shrunk as the tight employment situation has reduced their chances to obtain paid work outside the home.

On the other hand, there is every reason to believe that the long-term benefits of children have increased, even after making allowances for the lag between the time when costs are incurred and the time when benefits are reaped. But these benefits come only if the necessary initial investment is made in a child's education. With the increase in both the cost per child and the number of surviving children, most families in Kerala simply do not have the resources to make this initial investment too often. They have therefore reduced their family size, opting for a well-endowed small family over an ill-endowed large one.

Thus, mostly because of an increase in the cost of bringing up children in relation to family income, but partly also because of a slight decrease in the short-term benefits from children, people's perceptions of the economic advantages of raising a large family have undergone a major reversal over the course of the past several decades.

These historical developments have produced a long-term downward trend in desired family size, which in turn would be expected to be reflected in actual family size. It has been, but until recent years principally through delayed marriages among most socioeconomic groups and increased use of contraception among the well-to-do. It is doubtful whether the recent sharp decline in marital fertility, which has embraced all socioeconomic groups, was caused solely by this long-term change in attitude concerning family size. More likely, it was precipitated by two policy interventions: land reforms, agrarian reforms, and related redistributive policies; and the official family planning program. It is no coincidence that the beginning of the sharp fertility decline coincided with the implementation of land reforms and the strengthening of the official family planning program. The reforms accelerated the downward trend in desired family size long underway, and the official family planning program helped to translate the manifest or latent desire for fewer children into an actual fertility decline.

Land Reforms, Agrarian Reforms, and Related Policies

As pointed out earlier, Ratcliffe gives considerable credit to the recent reforms; in his view, the fertility decline was caused by an increase in the income of the poor resulting from the redistributive policies of the government. We attach much less importance to income changes, especially increases in income among the poor. But there are other aspects of the redistributive policies that have changed couples' attitudes about family size.

1/ The survey data show this is not completely true.

One such element is the economic deprivation resulting from the land reforms. Excess land (over the ceiling set by the government) was taken from the owners by the government and distributed among the landless. Others who did not own any excess land, but who had what land they did own cultivated by tenants, lost their land for token compensation. The most numerous of all land transfers involved the "hutment dwellers", 2/ who acquired legal ownership of their house sites together with some land around the house (about one-tenth of an acre in rural areas, less in urban areas).

Figure 9.1 gives a schematic representation of the impact of economic deprivation on fertility. For those who lost land or other sources of income, the effect was to increase the cost of children relative to remaining income. Such people were economically well-off, accustomed to giving their children good education, food, and health care. The sudden loss of income did not change their desired behavior with respect to their children's development; instead it caused them to make demographic adjustments toward later marriages and fewer children.

If some groups lost land and other sources of income, others -- such as former tenants and hutment dwellers -- must have gained. It is doubtful, however, whether former tenants benefited substantially by changes in the legal ownership of land. Moreover, the risks involved in agriculture and the cost of cultivation have increased considerably. The new owner-cultivators who have their farming done by hired labor probably experienced little significant increase in income due to the land reforms. In many cases, their income decreased.

The case of the hutment dwellers is slightly different. They experienced no economic deprivation. At the same time, after land reform it became difficult for their older children to obtain house sites. Marriages were postponed, and those who did marry changed their attitude about desired family size.

A second element of the land and agrarian reforms, perhaps more important than any resulting economic deprivations, were the wage increases. Wage increases affected the fertility trend in two ways. First, the short-term benefits from children fell. As Ratcliffe points out:

> Finally, opportunities for child labour have been virtually eliminated due to enforcement of minimum wage and child labour laws... And when value of children as employable economic assets declines, so does fertility. (p. 139)

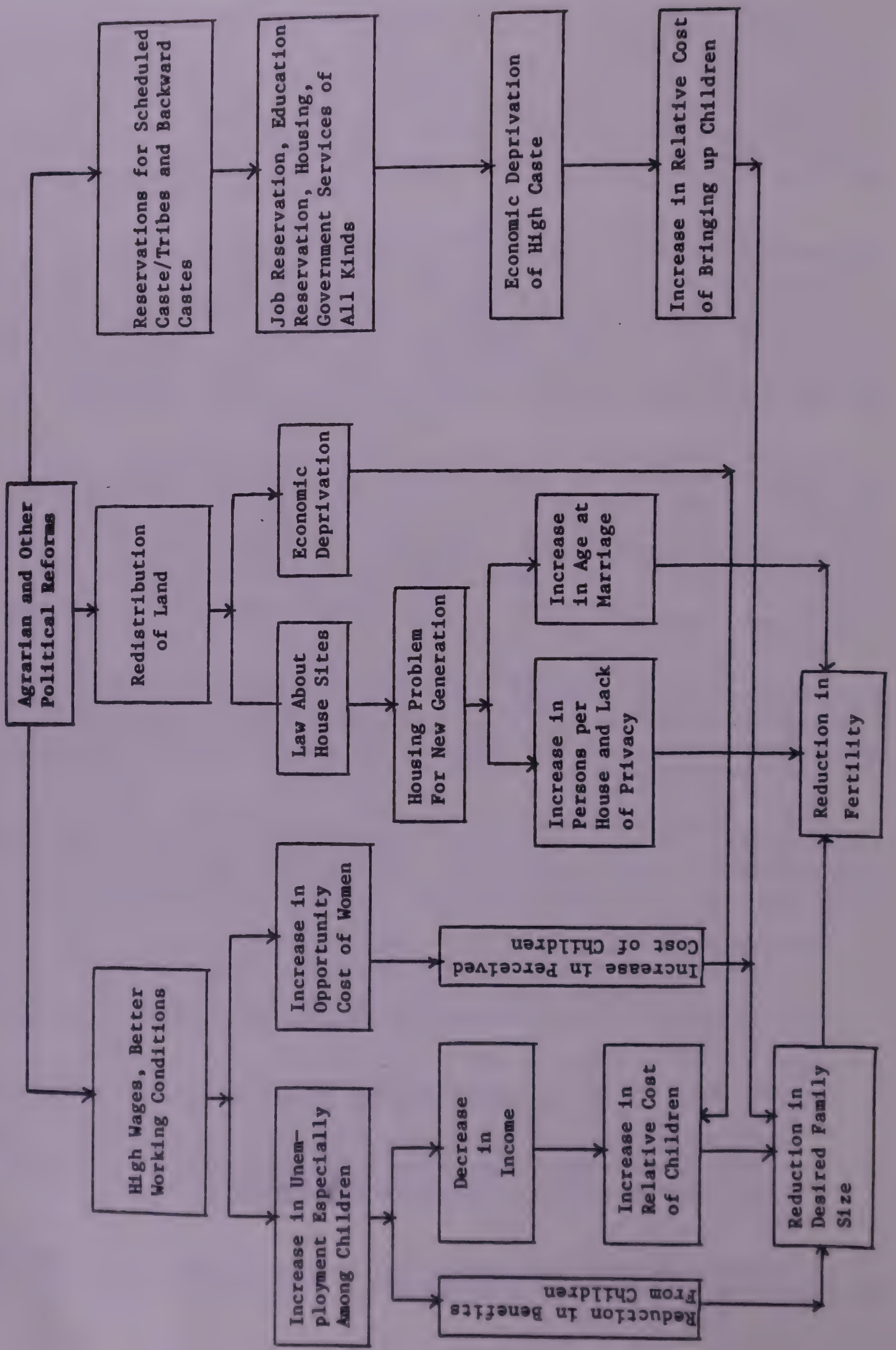
A similar point is made by Mencher regarding agricultural laborers:

> ...though the statutory minimum wage rates are high in Kerala, the number of days for which employment is available for agricultural labourers is very small... In this

---

2/ Hutment dwellers are low-income households living in huts they have constructed on land that belonged to others.

Figure 9.1: Impact of Land Reforms, Agrarian, and Other Reforms on Fertility Trends in Kerala


Agrarian and Other Political Reforms
Redistribution of Land
Reservations for Scheduled Caste/Tribes and Backward Castes
Job Reservation, Education Reservation, Housing, Government Services of All Kinds
Economic Deprivation of High Caste
Increase in Relative Cost of Bringing up Children
Economic Deprivation
Law About House Sites
Housing Problem For New Generation
Increase in Age at Marriage
Increase in Persons per House and Lack of Privacy
Reduction in Fertility
High Wages, Better Working Conditions
Increase in Opportunity Cost of Women
Increase in Perceived Cost of Children
Increase in Unemployment Especially Among Children
Decrease in Income
Increase in Relative Cost of Children
Reduction in Desired Family Size
Reduction in Benefits From Children

> situation where agricultural labourers are in a sense driven to the wall, I am arguing that while people still want children, they do not see any economic advantage in having large families and this--coupled with the fact that with better medical facilities, the children that they have are likely to live to adulthood--makes even agricultural labourers (including the illiterate) amenable to family planning. (p. 1787)

Wages have been kept artificially high in all economic sectors, especially agriculture, by the powerful trade unions and a sympathetic government. As a result, the volume of employment has decreased considerably and employment opportunities for children and adolescents have disappeared altogether.

The higher wages and better working conditions introduced by the agrarian reforms had another important effect: they increased the income potential and thereby the opportunity cost of women. The income potential of women has also increased through education, but this applies only to those who complete high school or college. Thus, as a consequence of agrarian reforms, income from children has decreased at the same time that the opportunity cost of mothers has increased. Both changes tend to reduce the desired family size of both the rich and the poor, but especially of the latter, and to make them receptive to family planning.

The Official Family Planning Program

A good deal of the credit for the sharp fertility decline among the agricultural laborers and other economically backward sections of Kerala's population should go to the official family planning program. The socioeconomic and demographic conditions we have been discussing created a situation in which a fertility decline was both possible and desirable. But without the official family planning program, it is doubtful whether a fertility decline of the magnitude observed in the lower class would have taken place.

The official family planning program in Kerala is not only a means for providing contraceptive services; it has also been an independent causal factor in changing family size norms, and in creating and strengthening demand for family planning services. As Freedman says in his reassessment of the theory of fertility transition (1979):

> I now believe there is a case for the thesis that once motivation is present, both the concept of and the means for family limitation can have independent causal effects in determining both the timing of the onset and the rapidity of the fertility decline. (p.8)

In the case of Kerala, the official family planning program has gone one step further. As a result of the economic incentives offered to officials and acceptors, the program was able to create demand even where it did not previously exist. Thus, the program provided services where demand existed, strengthened demand where it was weak, and created demand, especially among the poor, where no demand existed previously.

Empirical Evidence

The data most suitable to test the hypothesis propounded above -- namely that the fertility decline in Kerala was caused by recent policy interventions aided by some very favorable long-term socioeconomic changes -- are time-series on fertility rates and the identified causal variables. But the data at our disposal are limited to those collected in a one-time survey in 1980. The fertility decline took place mostly during a 20-year period prior to the survey; the land reforms and other agrarian reforms were implemented mostly between 1960 and 1970; and the improvements in education and health extended over more than a century. A one-time survey has severe limitations in reflecting the consequences of changes occurring over lengthy and varying periods of time. Nevertheless, some evidence concerning the determinants of the fertility decline is available from the survey data. Following our theoretical framework, we shall discuss the educational costs borne by parents; the short- and long-term benefits accruing to parents; the impact of rising educational attainment and a falling mortality rate; and the consequences for fertility of both agrarian reforms and the official family planning program.

Cost of Children

The survey has not made a systematic study of the cost increases in education. However, some data on attitudes about the desired level of education were collected and these are pertinent to the issue of cost.

Our assertion about the cost increase of bringing up children is based on the assumptions that the desire for higher education has become very widespread in Kerala, that the average desired length of schooling has increased substantially, and that the number of surviving children per family to be educated has also increased substantially. The last point is well documented by the decline in the infant and child mortality rates (Zachariah and Patel, forthcoming). Evidence on the other two points is given below.

The aspirations of mothers regarding their children's education are very high compared to their own educational attainment. Table 9.1 gives the average desired years of schooling for boys and girls as reported by ever-married women, classified by the length of their own schooling (for girls) and of their husband's schooling (for boys). The illiterate women want their children to be educated to the matriculation level, a shift of ten years, on average, in one generation. The best educated women want their children to be educated to the degree level, an increase of three or four years in one generation. More than 40 percent of the women think that boys should have a mimimum educational attainment of a first degree to compete successfully in the socioeconomic environment of Kerala (Table 9.2). Thus, almost all women in Kerala, irrespective of their own educational status, want their children to be educated to matriculation at least, and to the degree level if possible.

Table 9.1 Expectations about education of boys and girls by age of mother and education of parents, three districts combined, Kerala

Average desired years of schooling for boys

Age of mother	Education of father			
	No schooling	1-4 years	5-9 years	10+ years
15-19	10.0	10.4	11.6	13.1
20-24	10.5	11.3	11.3	13.7
25-29	11.0	11.1	12.3	14.2
30-34	11.0	11.7	12.2	13.9
35-39	11.1	11.4	12.5	14.5
40-44	11.1	11.8	12.7	14.9
All ages	11.0	11.5	12.3	14.1

Average desired years of schooling for girls

Age of mother	Education of mother			
	No schooling	1-4 years	5-9 years	10+ years
15-19	8.4	9.3	10.9	11.0
20-24	9.0	9.8	11.3	14.1
25-29	9.2	10.2	11.8	14.2
30-34	9.1	10.6	11.9	14.5
35-39	9.3	11.2	12.0	14.5
40-44	9.8	10.9	11.8	14.4
45-49	9.9	11.2	12.8	14.3
All ages	9.5	10.7	11.8	14.3

Table 9.2 Percentage of ever-married women by minimum education thought necessary for boys and girls, three districts combined, Kerala

Mimimum education	Boys	Girls
Matriculation	53.2	60.3
Degree or Diploma	44.3	30.1
Other	2.5	9.6

The desired years of schooling is not a fictitious number. A majority of women (63 percent) felt that their children would achieve their educational goals. The other 37 percent, however, thought that their children might not do so. Several reasons were given, but the most important one was lack of money (Table 9.3). One out of four women surveyed felt that financial problems would stand in the way of their children's staying in school for the desired number of years. More younger women than older ones reported this, indicating the possibility of a rising trend in the cost of education.

Thus, although the survey does not provide direct data on the subject, it does provide sufficient indirect evidence to support the hypothesis that each family must allocate a larger share of its income to educational expenses than was true in years past. While the cost of educating an individual child to a certain level has perhaps declined, the total educational cost per family has grown considerably, due to the increase in both desired length of schooling and number of surviving children. And this is true for all classes of society.

Table 9.3 Reasons given for children's possible nonachievement of desired education, three districts combined, Kerala

Reasons	For boys		For girls	
	Number	Percentage	Number	Percentage
Lack of money	484	65	449	61
Needed at home	17	2	74	10
Not good at studies	172	23	128	17
Got job	8	1	1	—
Other	61	9	81	12

Benefits from Children

The benefits from children have not kept pace with the rise in cost discussed above, according to our hypothesis. While there is no reason to believe that the long-term benefits from children who receive a good education have decreased, there is every reason to believe that the short-term benefits -- those realized while the children are still young -- have fallen significantly.

Short-term benefits. All women with children in the 8-12 year age group were asked whether their children help them around the house. Those with children twelve years or older were asked further whether their children worked and contributed to the household income.

Table 9.4 gives the data on children's helping around the house. Most women (66 percent) felt that their children were a great help. There is no significant variation in answers by age of the mother, indicating the absence of any trend regarding this short-term benefit. If there is any decrease in the help given, it is because children are away at school, not because they do not help when at home.

Table 9.4 Children's help around the house, three districts combined, Kerala

Age of mother	Number of women: Children help	Children do not help	Total	Percentage of women who think children help
15-19	1	1	2	50
20-24	3	4	7	43
25-29	77	67	144	54
30-34	201	118	319	63
35-39	253	97	350	72
40-44	162	88	250	65
45-49	138	61	199	69
Total	835	436	1,271	66

Table 9.5 Children twelve years and over who work and contribute earnings to household, three districts combined, Kerala

Age of mother	Number of women with children 12+	Children who work: Number	Percentage	Number of children who contribute to household income	Percentage of women with children who work and contribute to household income
15-19	--	--		--	--
20-24	--	--		--	--
25-29	10	2	20	2	20
30-34	133	9	7	9	7
35-39	321	80	25	77	24
40-44	359	147	41	141	39
45-49	380	214	56	206	54
Total	1,203	452	38	435	36

Financial help from children twelve and over was less prevalent (Table 9.5). The reason was not that children were unwilling to share their wages (96 percent of working children gave their wages to the household), but rather that they were not working. Only 38 percent of the children had ever worked for pay. Of the mothers whose children contributed to the household income, most (80 percent) were in the 40-49 age group. In short, about one in three households received some direct financial contribution from their children, but much of this contribution came only when the couples were somewhat older. For women in the prime reproductive ages, the immediate benefits from children were limited to help with the household chores. Financial assistance was something to look forward to later, if their children could find jobs.

Long-term benefits. All ever-married women were also asked about their expectation of long-term benefits from their children. In particular, they were asked

- whether their children are likely to help the family later on;
- what means of financial support they might have when they become old; and
- whether they expect to live with their children when they (the children) grow up.

One important aspect of the determinants of fertility in Kerala is brought out by the answers to these questions. Table 9.6 indicates that all but 5 percent of the women surveyed expected that they would receive help from their children later on in life. There was very little variation by age; younger women answered the same way as older ones. Parents' dependence on their children in their old age has been and still is a way of life in Kerala.

Table 9.6 Expectation of future economic help from children, three districts combined, Kerala

Age of mother	Number of women				Percentage who expect help from children
	Expect help	Do not expect help	Uncertain	Have living children	
15-19	77	3	11	91	85
20-24	316	13	32	361	88
25-29	440	34	41	515	85
30-34	379	27	23	429	88
35-39	389	28	13	430	90
40-44	361	13	16	390	93
45-49	394	19	12	425	93
Total	2,356	137	148	2,641	89

The second question touched on the same subject but was phrased differently. Of the 2,694 women who answered it, 1,452 or 54 percent expected their children to support them financially in their old age (Table 9.7). The proportion who expected to rely on their children did not show any significant variation by age. If there was any trend, it was that the younger women expected to depend on their children's help even more than the older women. Most women gave considerable importance to this help, and nearly 90 percent said they would eventually live with their children.

Table 9.7 Expectation of old age financial support from children, three districts combined, Kerala

Age of mother	Expect help from children		Other means of support				
	Number	Percentage	Savings	Income from family farm business	Pension	Other	Total
15-19	55	60	3	9	14	10	91
20-24	211	58	5	27	65	57	365
25-29	276	53	15	34	99	101	525
30-34	215	49	6	34	101	80	436
35-39	233	53	4	21	100	81	439
40-44	231	58	5	12	92	58	398
45-49	231	53	3	20	119	67	440
Total	1,453	54	41	157	590	454	2,694

The data provided considerable support for the hypothesis that the expected long-term benefits from children are very high in Kerala. Since the educational attainment of children is increasing, the benefits from them should also be increasing. The anticipated dependence on children for old age economic security should affect desired family size; parents will attempt to ensure that they have at least one son to care for them.

The desired family size has declined to a mode of 3 in response to the substantial increase in child survivorship. For it to decline further, say to replacement level, would require assurance of some alternate means of old age support. The fertility decline in Kerala might reach a plateau unless this problem is satisfactorily resolved.

In order to understand more precisely how the cost-benefit ratio of children influences the fertility trend, we shall review the survey's findings on the link between fertility on the one hand and certain socioeconomic changes on the other. These changes relate to education, infant mortality, land and other agrarian reforms, and the official family planning program.

Education

It was hypothesized above that in the changed socioeconomic environment in Kerala, educating one's children has become a necessity; and as education has spread, so has both the desire and the ability to produce a smaller family. Education has had a multitude of effects: it has increased the cost of rearing children, reduced their economic benefit, increased the opportunity cost of women, increased the risk of unemployment at younger ages, helped couples to make rational decisions about family size, and enabled them to use contraceptives more effectively. If our hypothesis is correct, education should be negatively related to the desired number of children. The changed attitude about family size, in turn, should increase the age at marriage and/or increase family planning practice and thus reduce the number of children born.

WHI 130
HEALTH CE

Desired family size. Table 9.8 gives the desired family size by educational attainment of the mother. As expected, educated women desire a smaller family than illiterate women--the difference is 1.4 children between those with no schooling and those with at least ten years of schooling. That this difference is not entirely due to differences in age distribution is shown by the standardized averages, which also decline systematically with an increase in years of schooling.

Age at marriage. The lower desired family size of educated women is achieved through later marriage and/or fertility control within marriage. The age at marriage should therefore be positively related to years of schooling. Table 9.8 indicates that illiterate women begin married life 4.3 years earlier than women with at least ten years of schooling. Among recently married women, the difference is smaller (2.7 years among those married in 1975-80, compared with 7.2 years among those married before 1960), but adjustment for the year of marriage does not remove all differences. The standardized averages show a spread of 3.5 years. Thus, one avenue by which educational attainment reduces fertility is through a reduction in the period of exposure to childbearing due to delayed marriage. Can this account for the entire difference? Apparently not. Rough calculations show that during the years 1950-80, out of the total educational differential in fertility, 55 percent was due to an increase in the age of marriage and 45 percent to reduced fertility rates within marriage (Annex Table 6).

Table 9.8 Desired family size by age at marriage and education, three districts combined, Kerala

Education	Average desired family size		Average age at marriage (years)	
	Actual	Standardized	Actual	Standardized
No schooling	3.80	3.60	17.5	18.1
1-4 years	3.39	3.34	18.3	18.5
5-9 years	3.02	3.15	19.1	18.7
10+ years	2.47	2.52	21.8	21.6
All	3.25	3.25	18.8	18.8

Family planning. Fertility reductions within marriage are achieved principally through use of contraceptives or sterilization. If educated married women desire fewer children, they should know more about family planning and practice contraception more often than illiterate women. Table 9.9 gives the necessary data for comparison. The overall relationship between education and both family planning knowledge and use is positive. With respect to sterilization, however, the relationship is curvilinear; the maximum sterilization rate is to be found among women with six years of schooling (see Figure 7.1.). Factors other than, and not positively correlated with, education -- such as financial incentives -- help determine whether a person accepts sterilization or not. This could explain departures from the expected overall negative relationship between fertility level and educational attainment.

Table 9.9 Knowledge and practice of family planning by education, three districts combined, Kerala

Education	Percentage of women who know at leaast one method	Percentage of users of conventional methods among non-sterilized women		Percentage sterilized	
		Current use	Ever-use	Ever-married women	Currently married women
No schooling	75	8.0	16.5	21.6	25.2
1-4 years	89	22.9	46.5	33.8	39.2
5-9 years	94	33.1	59.2	29.3	32.7
10+ years	98	49.6	76.8	18.5	20.3
All	84	25.9	47.0	27.8	31.6

Excess fertility. Among the women surveyed who had more than or equal to the number of children they desired, about 58 percent used some fertility control method. The degree of effort to avoid undesired pregnancies was much greater among the more educated, however (Table 9.10). Among women with ten or more years of schooling, 76 percent practiced contraception; among illiterate women, only 37 percent did so, even though they already had more children than they desired.

Table 9.10 Percentage of women who are sterilized or use a conventional family planning method by education and fertility status, three districts combined, Kerala

Education	Fertility status		
	More children born than desired	Children born equal desired number	Less children born than desired
No schooling	37	30	9
1-4 years	60	63	14
5-9 years	65	69	28
10+ years	76	72	39
All	55	60	24

Fertility. Several measures of fertility based essentially on birth history are given in Table 9.11. They all show, in essence, that the more a woman is educated, the fewer number of children she has or the lower her fertility. Among older women (with marriages of 25 years or more), the illiterate women have 1.4 children more than the women with at least ten years of schooling. This difference has narrowed in recent years, to only about 0.7 children for the period 1975-79.

A comparison between two periods a decade apart, 1965-69 and 1975-79, indicates not only a decrease in the magnitude of the differentials, but also a change in the pattern of the relationship between education and fertility. This was perhaps inevitable in Kerala, where sterilization has been the principal means of fertility control; the sterilization rate varies parabolically as educational level increases, with a maximum rate at six years of schooling. In a detailed analysis of the relationship between fertility and education, it is necessary to take account of this "disturbance" caused by program-related factors such as financial incentives and official pressure.

Table 9.11 Fertility rates by education, three districts combined, Kerala

Education	Mean number of children ever-born		Completed family size	TMFR' (total marital fertility rate for women 20-44 years only)		
	Observed	Standardized		1965-69	1970-74[a]/	1975-79[a]/
No schooling	4.49	3.61	5.83	6.23	5.45	4.79
1-4 years	3.80	3.55	5.71	6.76	5.12	4.41
5-9 years	2.90	3.34	5.12	6.26	4.62	4.67
10+ years	2.13	2.80	4.40	5.03	5.75	4.08
Difference between first and last group	2.36	0.81	1.43	1.20	-0.30	0.71

a. The irregularities seen in the pattern of relationships in these periods may be explained by the very large number of sterilizations carried out in the camps in Ernakulam and Palghat Districts. The highest sterilization rate was among men whose wives had 1-4 years of schooling.

In the discussion above regarding the impact of years of schooling on fertility and fertility-related variables, we have considered one variable at a time. Although some of the averages have been standardized to take into account differences in demographic composition (such as age and year of marriage), they have not been standardized for socioeconomic differences. It is possible, for example, that the observed difference between the fertility level of the literate and the illiterate is due to some third variable that is correlated with both fertility and literacy.

That this is not entirely the case, however, is shown by the partial regression coefficients given in Table 9.12. These coefficients have been estimated after controlling for the available socioeconomic and demographic variables (age, caste, household expenditures, land owned by household, and so on).

Table 9.12 Partial regression coefficients of selected fertility-related variables on years of schooling

Dependent variable		Regression coefficient	F-value
Desired family size (number)		-0.02568	12.9
Age at marriage (years), women 25+ years		0.68935	5.5
Knowledge of any family planning method (yes/no)		0.02750	25.6
Use of conventional method (yes/no)		0.03939	18.7
Sterilization status, husband or wife (yes/no)	Linear	0.03551	19.4
	Quadratic	-0.00285	16.0
Sterilization or use of conventional method (yes/no)	Linear	0.052598	38.3
	Quadratic	-0.002482	10.9
Fertility measure			
Children ever-born		-0.07539	33.1
Children born 1965-69		-0.03338	8.6
Children born 1970-74		-0.00772	0.8 a/
Children born 1975-79		-0.01387	5.2

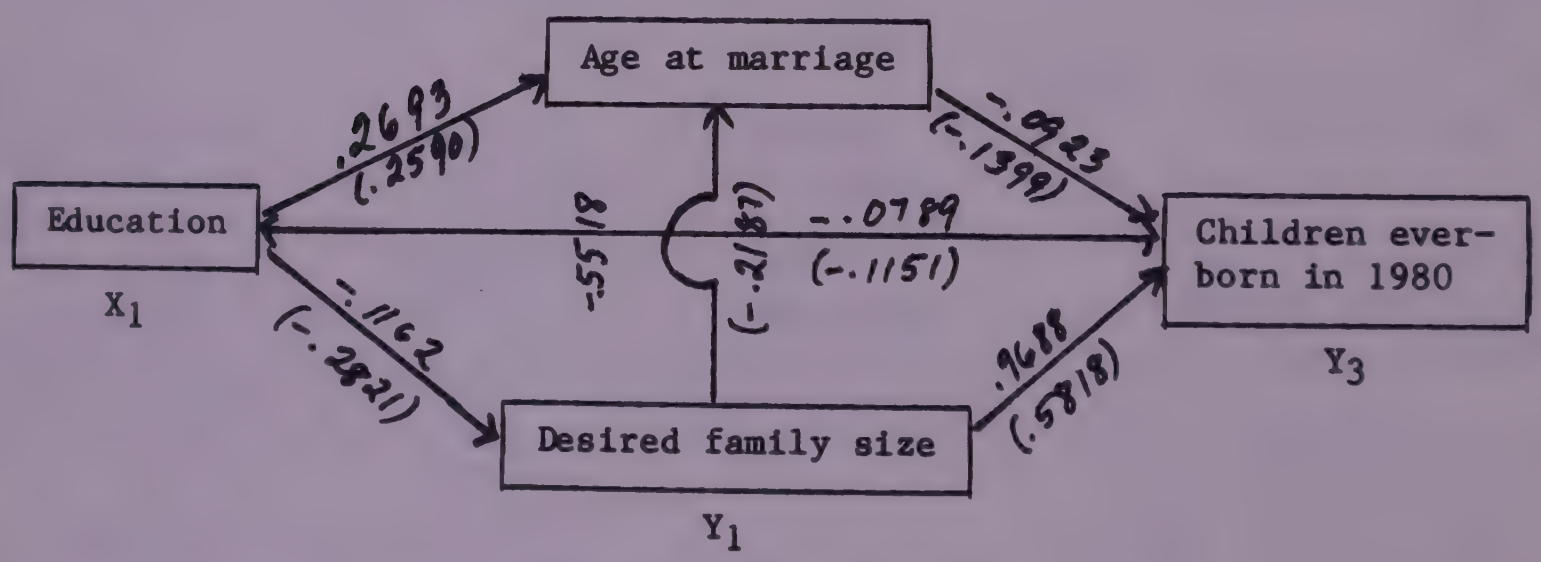
a. Statistically not significant.

All the partial regression coefficients are in the expected direction, and all are statistically highly significant except the one for births during 1970-74. There is a faint negative association between the

number of births to a woman in 1970-74 (0,1,2,3...), and her years of schooling, but the relationship is far from significant. As mentioned above, this may be due to the disturbing effect of camp-induced sterilizations, which were more attractive to uneducated or less educated couples -- because of financial incentives and other economic benefits, favors from public officials, and so on -- than to those where the wife had ten or more years of schooling.

We can now give the relationship between education and fertility in a simple recursive model (Figure 9.2). Family planning is not introduced in this model because, in the Kerala context, the direction of the relationship between children ever-born and family planning practice is uncertain. Fertility influences decisions about the adoption of family planning, rather than family planning determining fertility level. The correlation between them, even after controlling for socioeconomic variables, is generally positive.

Figure 9.2 Recursive model of the relationship between education and fertility, Kerala



Note: Figures in parentheses are standardized coefficients based on the indicated variables.

The least squares estimation of the parameters gives the following results:

$$Y_1 = 3.7873 - 0.1168x_1 \quad (R^2 = 0.08)$$
$$Y_2 = 19.2876 + 0.2694x_1 - 0.5528Y_1 \quad (R^2 = 0.15)$$
$$Y_3 = 2.4219 - 0.0788x_1 + 0.9692Y_1 - 0.0931Y_2 \quad (R^2 = 0.47)$$

The direct effect of education on children ever-born was -0.1151, with an F-value of 5.7, and the indirect effect through desired family size and age at marriage was -0.2089.

Desired family size and age at marriage are not the only ways by which education could have affected fertility. For example, we have not taken into consideration infant mortality, which is negatively related to education of the mother. The present analysis therefore underestimates the impact of education on fertility.

Infant Mortality

Among the Indian States, Kerala is unique when it comes to infant deaths; its mortality rate has been and still is the lowest in the country. The probability of a baby dying during its first twelve months of life is three times greater in India than in Kerala. This low mortality rate, with its recent rapid decline, has been proposed as one of the principal factors underlying the much larger fertility decline in Kerala than in the rest of India. Is there any empirical support for this hypothesis?

A crude indication of the possible impact of the low mortality level on the fertility decline in Kerala is provided by regional fertility and mortality data. As seen in Table 9.13, the mortality decline began in the southern parts of the State (Travancore-Cochin) and later spread to its northern part (Malabar). It is no coincidence that the fertility decline also began earlier and is much larger in the south.

Table 9.13 Birth rates and death rates in Kerala by region, various years, 1956-75

Year	Malabar		Travancore-Cochin	
	Death rate	Birth rate	Death rate	Birth rate
1956	23	47	10.4	35
1967		37		32
1970	12	36	8.0	29
1975	8	31	6.0	25

Short-term effect. Mortality decline is a slow process, and much of its effect on fertility permeates rather slowly. There are, however, some short-term effects as well. One such effect is on birth intervals. An infant's death cuts short the period of breast-feeding, reduces the period of postpartum amenorrhea, shortens the interval between births, and thereby increases fertility. A decline in infant mortaility would therefore decrease fertility.

Empirical data to test this assumption is given in Table 9.14. All births of a given order (for example, first births) are classified according to mortality experience (for example, whether the child died during the first month or during the first through eleventh month, or survived the first twelve months); also, the average birth interval between that birth order and the next birth order is calculated (for example, between first and second births) for each mortality experience. A comparison of the average birth intervals indicates how much influence the death of a child has on the subsequent birth interval.

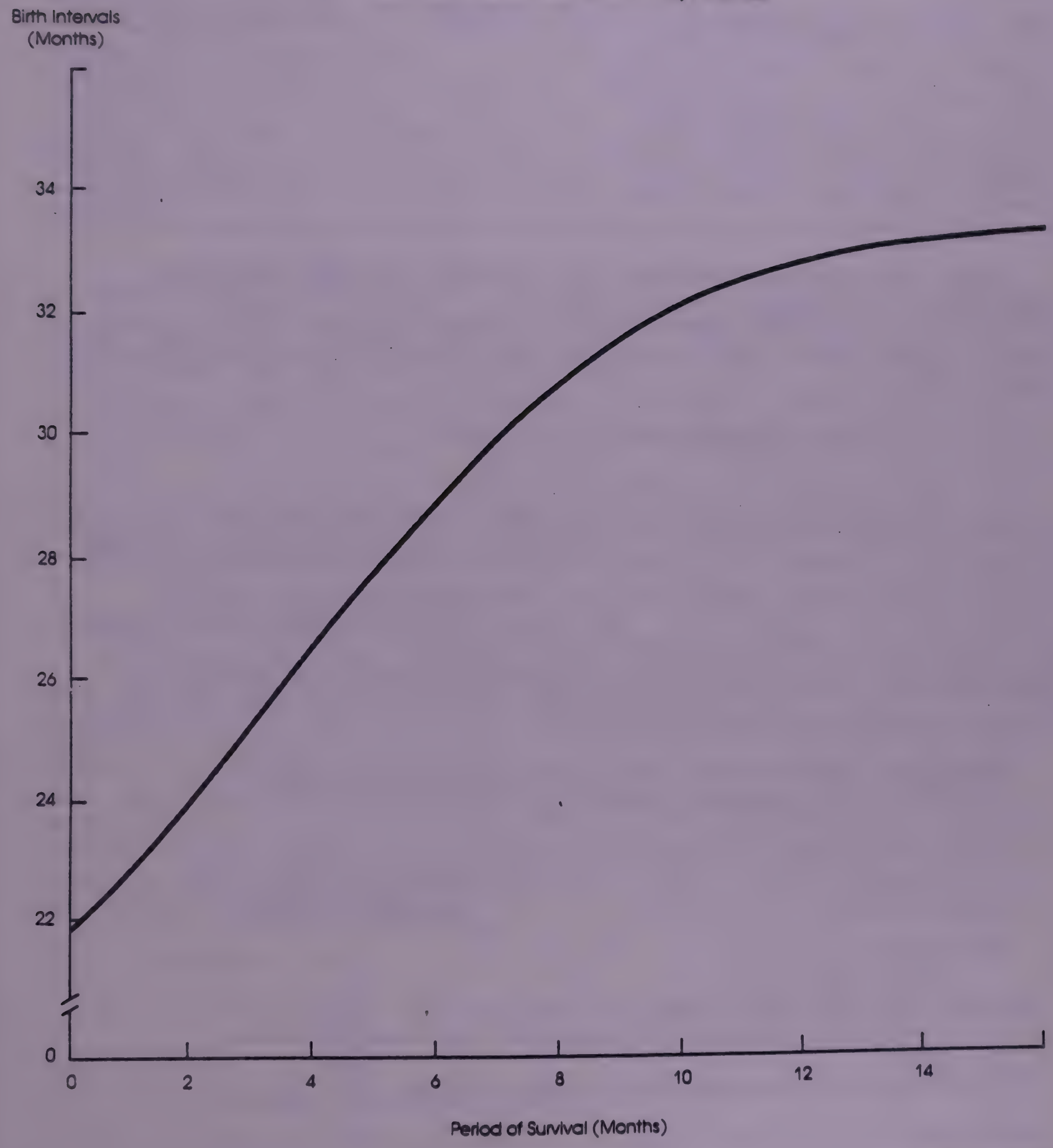
Table 9.14 Average birth interval in months classified by mortality experience of initial birth, three districts combined, Kerala

Birth order intervals	All births	Initial birth ended in death under one month	Initial birth ended in death between one and twelve months	Initial birth survived first twelve months
1 and 2	32.5	21.7	28.2	33.5
2 and 3	33.9	25.0	31.9	34.4
3 and 4	32.3	22.6	26.7	32.9
4 and 5	33.1	22.1	28.9	33.7
5 and 6	31.8	22.1	22.2	32.7
All birth orders	32.7	22.7	27.6	33.4
Difference from twelve-month survival		-10.7	-5.8	-

As expected, the average birth interval is shortest when the initial child died during the first month, and longest when it survived the first year. A neonatal death shortened the birth interval by an average of 10.7 months, while a death later in infancy reduced it by 5.8 months (see also Figure 9.3).

The relation between birth intervals and the mortality status of the initial birth is examined further in Table 9.15 by means of a multiple regression analysis. The mortality variable was assigned a value of 1 if a baby died the first year and 0 if the baby survived infancy. The partial regression coefficients are all statistically significant and negative, indicating that the death of a child decreases the next birth interval. The average decrease is 10.7 months for the first interval and 6.9 months for the second, increasing to about 10 months for intervals between higher parities.

Figure 9.3
Birth Interval Following an Infant Death by Duration of Survival (Months), Kerala



World Bank—24897

Table 9.15 Partial regression coefficients of birth interval on mortality status of initial birth and socioeconomic and demographic variables

Birth order interval	Regression coefficient with Mortality status	Caste	Age at marriage	R^2
1 and 2	-10.71 (46.3) a/	-	-0.513	0.19
2 and 3	- 6.90 (12.8)	3.1	-	0.13
3 and 4	- 9.10 (22.6)	-	-	0.16
4 and 5	- 9.09 (9.8)	3.7	-	0.16
5 and 6	-10.99 (14.3)	-	-	0.19
6 and 7	-10.51 (5.3)	-	-	0.20

Note: Several other socioeconomic variables were included in the regression (land, household expenditures, etc.), but none showed a statistically significant relationship with birth interval. The number of women at higher parities was relatively small; hence, higher birth intervals are not shown.

a. The figures in parentheses are F-values.

If the death of a child in infancy reduces the next birth interval as shown in Table 9.15, then the occurrence of a twin birth should increase the next birth interval for the same reasons. Twin births are relatively infrequent, but the few cases that were reported indicate that such an increase did occur (Table 9.16). The average birth interval for all births in Kerala was 32.7 months; but for births following a twin birth, in which both twins survived infancy, it was 40.1 months. Among twin births, the subsequent birth interval was smaller when one of the twins died in infancy and smallest when both the twins died.

Table 9.16 Average birth interval following a twin birth, three districts combined, Kerala

Type of birth	Subsequent birth interval (months)
Twin births in which	
both twins died	25.6
one of the twins died	27.3
both twins survived	40.1
All births	32.7

In conclusion, the short-term effect of infant survival on fertility can be estimated as a ratio of the increase in the birth interval due to infant survival compared to the birth interval in cases of infant death. In Kerala the ratio was $\frac{9.5}{24} = 0.4$,

which indicates that corresponding to the survival of every infant there is a short-term fertility decrease of 0.4 or two-fifths of a child. Thus the data support the hypothesis that part of the fertility decline in Kerala was due to the drop in the infant mortality rate, which fell from a level of above 150 per thousand live births before 1950 to a level below 50 by 1980. It is difficult, however, to measure the full impact of this change on fertility. The direct effect on birth intervals is likely to be only a small fraction of all the indirect effects operating through a wide range of intermediate variables.

Long-term effects. As mentioned above, much of the impact of mortality decline on fertility is long-term; it operates through a change in the desired family size. If mortality declines substantially, as it did in Kerala, parents need to bear fewer children to achieve the size family they want. Between 1950 and 1980, the probability of survival from birth to ages 15-19 years increased by about 25 percent. Therefore, parents could reduce the number of children ever-born by 25 percent without this necessitating any decrease in the desired size of their family. If couples do not have fewer children -- and many did not in the initial phase of mortality decline -- then the number of surviving children will increase, the family's cost of bringing up its children will increase, and this will ultimately lead to a decline in the desired family size.

Land Reforms and Agrarian Reforms

Land reform was hypothesized as one of the redistributive policies that affected fertility -- through a decrease in income of the landed class; through a decrease in income of the middle-class farmers; and through an increase in housing problems among the hutment dwellers. We were thus led to expect a faster dcline in fertility among these who lost rather than gained land, and a tendency to postpone marriage and to control fertility within marriage among the hutment dwellers. The available data permitted a partial testing of these assumptions. The survey collected information on all land transfers carried out by the sample households during the preceding decade. The following questions were used:

During 1970-80,

- has the amount of land owned and/or cultivated by the household increased, decreased, or remained unchanged?
- how much land was purchased by the household; how much was sold?
- how much land was received as a gift; how much was given away as a gift?
- how much land was gained or received through land reforms; how much was given away or lost through land reforms?

The last question asks specifically about land transfers due to land reforms. Since the reference period was 1970-80, which does not cover the entire land reform period, not all such land transfers are included. But use of a longer period (say 1960-80) would have resulted in a much larger recall lapse.

The survey data indicate that 285 households (only 221 of which included an ever-married woman 15-49 years old) had gained land through land reforms, while 60 households (41 of which included an ever-married woman 15-49 years old) had net losses. The average net gain was only 11 cents; 3/ the average loss was much higher, 184 cents. The distribution of households that gained land through land reforms shows that 89 percent of them had gains of 10 cents or less (Table 9.17). Thus, nearly 90 percent of all gains are likely to have been transfers of land to the hutment dwellers.

Table 9.17 Distribution of land transfers due to land reform, three districts combined, Kerala

Land (cents)	Number of households with ever-married women	
	Received land	Lost land
0-5	79	4
6-10	118	7
11-49	15	14
50-99	8	6
100+	1	10
Total	221	41
Mean	11.3	164
Mean: all households	11.1	184

Fertility and landownership. An indirect indication of the impact of land transfers on fertility is obtained from the overall relationship between fertility and landownership. For example, if fertility is not related to landownership, it is possible that a decrease or increase in amount of land owned (due to land reform) will not influence fertility. If land is a factor, however, its transfer from one household to another could have some effect on the fertility of women in the households affected. Table 9.18 presents the available data. In the past, fertility and landownership were negatively related: women in households with larger landholdings had a slightly lower fertility than women in households with smaller landholdings. But the association seems to have weakened in recent years. The differentials, where any exist, are much narrower.

3/ 1 cent = 1/100th of an acre.

Table 9.18 Fertility measures by ownership of land, three districts combined, Kerala

Land owned by household (cents)	Standardized average parity (1980)	Gross fertility rate 1965-69	Gross fertility rate 1975-79
0-5	3.53	299	147
6-10	3.65	285	157
11-49	3.50	272	148
50-99	3.29	279	140
100+	3.41	263	144

Regression analysis confirms the lack of any significant association between fertility and landholdings, but it contradicts the past negative relationship. Table 9.19 shows that the partial regression coefficient of landholding and births during 1965-74 is positive and statistically significant, but that fertility measures in more recent periods are not related to landownership.

Table 9.19 Standardized regression coefficients between landownership and fertility measures

Fertility measures	B-coefficient
Children ever-born	0.0416 (2.8) a/
Births 1965-74	0.0582 (2.2) a/
Births 1970-79	0.0341 (1.5)
Births 1975-79	0.0019 (0.0)
Births 1979	- 0.0123 (0.6)
Open birth interval	- 0.0171 (1.1)

a. Statistically significant. The figures in parentheses give the t-values.

Fertility and changes in landholdings. More relevant to our analysis is the relationship between recent fertility and changes in landholdings. The number of households that had experienced an increase or decrease in land owned due to land reform alone is not large, so land transfers through gift, purchase, and sale are also included.

The general fertility rates for the relevant categories of married women 15-49 years are given in Table 9.20. In 1975-79 women in households that gained land had higher fertility than those in households that neither gained nor lost land. This conclusion is the same whatever the source of land gain. Similarly, women in households that lost land have, on the whole,

a relatively lower fertility than those in households that did not change their landholding status. The sample size of women in households which lost land specifically through land reform is too small (41) to yield meaningful fertility rates, so no definite conclusion can be drawn about this particular group of women.

Table 9.20 General fertility rates of women classified by type of land transfer during 1970-80, three districts combined, Kerala

Women by type of land transfer in household		General fertility rate 1965-69	1975-79	Percentage Decline
All women	(2,655) a/	276	147	47
Land holdings increased, all causes	(727)	296	161	46
Land holdings unchanged	(1,621)	269	142	47
Land holdings decreased, all causes	(306)	261	140	46
Purchased land (net)		303	156	49
No transaction		270	146	46
Sold land (net)		281	145	48
Received land through land reforms	(221)	263	186	29
No change		277	143	48
Lost land through land reforms	(41)	(258) b/	(183) b/	(29) b/

a. Number of women in the group.
b. Sample size (41) is too small to give meaningful fertility rates.

A higher fertility rate among women in households which gained land is in accordance with the expectation of our theoretical model. But whether the observed differences are statistically significant, and whether they are due to factors other than land transfers, are questions not answered by Table 9.20. A multivariate regression analysis can partially fill this gap.

A regression analysis of births during 1975-79 on socioeconomic variables 4/ and land transfer variables gave the following coefficients for land transfer variables:

4/ The socioeconomic variables include caste, education of wife and husband, and household expenditures.

Land transfer variable	Standardized B-coefficient
Land transfer due to land reform	0.00699 (0.39)
Land transfer due to purchase/sale	0.00580 (0.33)
Land transfer due to all causes	0.02726 (1.55)

Note: The figures in parentheses give the t-values.

None of the coefficients are statistically significant. Thus, the observed higher fertility of women in households which gained land (Table 9.20) is due more to other socioeconomic differences between these women than to those associated with land transfers.

The lack of a significant association between recent fertility and landownership or land transfers during 1970-80 can be explained by the type of family planning services available. The principal method of birth control in Kerala is sterilization. According to the survey, 19 percent of all women were using a conventional family planning method, which in about two-thirds of the cases were ineffective, while 29 percent of the women were sterilized or had a sterilized husband. The percentage of sterilized couples was higher among households with small landholdings, undoubtedly due to the fact that acceptance of sterilization is determined as much if not more by the financial incentives attached to it as by the felt need for effective family planning. A fixed economic incentive is of more value to the landless than to rich landlords. The partial regression between landholdings and sterilization status was negative and statistically significant, indicating that through greater adoption of sterilization, families owning small amounts of land were able to bring down their fertility faster than families with large landholdings. As a result, by 1980 the fertility differentials between landholding classes were very small indeed.

Land transfers and fertility-related (intermediate) variables. The largest category of households affected, according to our theoretical framework, is that of the hutment dwellers. We have already suggested that the full effect of land reform on the fertility of hutment dwellers is yet to come through increased housing problems, consequent postponement of marriages, and increased practice of birth control. To test the survey data for any supporting evidence of this, we estimated regression coefficients between some of these variables and land transfers. The results are displayed in Table 9.21.

Table 9.21 Standardized regression coefficients between land transfers and fertility-related (intermediate) variables

	Dependent variable			
Independent variable a/	Desire for one more birth	Desired age at marriage of girls	Steriliza-tion status	Family planning practice of non-sterilized
Land transfers due to land reform	0.014 (0.6)	0.047 (2.6) b/	0.064 (3.3) b/	0.028 (1.3)
Land transfers due to purchase/sale	0.005 (0.2)	0.016 (0.9)	0.076 (4.0) b/	0.001 (0.1)
Land transfers due to all causes	-0.006 (0.2)	0.026 (1.4)	0.092 (4.8) b/	0.021 (1.0)

Notes: A positive coefficient for desired age at marriage means that those who gained land desire a higher age at marriage for girls. A positive coefficient for sterilization means that those who gained land are more likely to be sterilized than those who did not gain land.

a. The independent variables are used in three separate regressions along with other socioeconomic variables not shown here.

b. Statistically significant. The figures in parentheses give the t-values.

The desire for one more child is not related to any of the land transfer variables, nor is the use of a conventional family planning method. Desired age at marriage and sterilization status of the woman or her husband do, however, show a positive correlation with land gains. The desired age at marriage for girls as stated by women in households which have gained land through land reforms -- most of whom are hutment dwellers -- is significantly higher than that given by women not affected by land reforms. Similarly, women in households that gained land through land reforms are more likely to be sterilized or have a sterilized husband than those in households not affected by land reforms. It is difficult to arrive at any conclusion about women in households that have lost land through land reform as their number is too small for separate analysis.

Before we draw additional conclusions from this analysis, it is important to test whether the statistically significant relationships between land transfers and both sterilization status and desired age at marriage are actually due to the transfer of land, rather than to the total amount of land owned. Landownership, remember, is negatively related to sterilization status. Regressions including both landownership and land transfers during 1970-80 indicate that land transfers have an independent effect on

sterilization status and on desired age at marriage. The observed higher sterilization rate among those who gained land as a result of land reform is not due to the small size of the total landholdings owned by those families. Nor is the higher desired age at marriage due to the size of the landholdings. The relationship holds even when controlled for the amount of land owned. In fact, land owned as a variable by itself has no significant relationship with desired age at marriage. These conclusions give some empirical support to the hypothesis that the land reforms, by cutting off future house sites for the poor, have brought about a worsening of the housing problem and in that way helped stimulate fertility decline in Kerala.

We can return now to our original hypothesis: that land reforms affected fertility through a decrease in income of the landed class, who lost land through land reforms; through a decrease in income of the middle-class farmers, who were accustomed to having their farming done almost entirely through hired labor; and through an increase in the housing problems of the hutment dwellers, who found themselves unable to obtain new house sites for their grown-up children. Does the survey in fact indicate a faster decline in fertility among those who lost land than among those who gained land, and a tendency among hutment dwellers to postpone marriage and to control fertility within marriage?

The data showed a slightly higher fertility rate among those who gained land than among those not affected by land transfer, but a regression analysis indicated that the observed differences could not be attributed to land transfers during 1970-80. The partial regression between fertility in 1975-79 and land transfers of whatever kind in 1970-79 was not statistically significant. As a matter of fact, the amount of land owned by a household had very little relevance to fertility, no doubt because much of the fertility decline in Kerala is the result of sterilization, which is negatively associated with landownership.

It is premature, however, to conclude that land reforms had no effect on reducing fertility in Kerala; much of the effect is yet to come. There is already some indication that the hutment dwellers (households with less than 10 cents of land) are modifying their family-building habits; the land reforms have played a part in this change.

The major effect of land reforms on Kerala's fertility, however, is likely to come about not through land transfers, but through a change in values. Land reforms and the related redistributive policies of the post-Independence governments of Kerala have fundamentally altered the attitude of people toward landed property as a source of economic security. Land was long the principal means of income for a household, its most important economic asset. But no longer. Land -- particularly agricultural land -- has lost much of its prime position in the economics of Kerala society. Personal attributes -- education and health -- have taken its place. This fundamental reorientation of values has had, and will continue to have, a much deeper and more long-lasting effect on the demand for fertility control than the physical redistribution of land brought about by land reform.

Official Family Planning Program

Much of the fertility decline among married women occurs through family planning, conscious or unconscious. All family planning need not result from the efforts of an official program, however. In fact, in many populations family planning practice has nothing to do with official policies or programs; they do not exist. In the case of Kerala, however, the official program -- according to our hypothesis -- has been a major factor in reducing fertility, not only among those who wanted fewer children, but also among the indifferent and among those who were attracted to the financial incentives offered.

Not all analysts of the Kerala situation have shared this view. Nair (1974) concluded that the fertility decline in Kerala began in the early 1960s prior to the intensification of the family planning program, with education and mortality factors playing a critical role. Krishnan (1976), on the other hand, pointed to changes in the marriage rates brought about by sharply increased female literacy. Kurup and Cecil (1976) attributed the decline in the birth rate mainly to increased acceptance of the family planning program. As mentioned earlier, Ratcliffe (1978) did not think that the family planning program played any major role in the fertility decline.

We agree with Nair that some decline in the birth rate and in the total fertility rate (but not in the marital fertility rate) took place before the intensification of the official family planning program, primarily because of a fall in the nuptiality rate. A significant decline in the marital fertility rates, however, began only in the 1960s, coinciding with the implementation of land reform and the intensification of the family planning program.

What empirical evidence can be given to support our hypothesis? Methodologically, it is rather difficult to show what would have happened to Kerala's fertility trend without the official program. Three approaches were adopted in an attempt to answer this question:

- comparison of the fertility level and trends with official family planning outputs;
- comparison of the Kerala and Sri Lanka experiences; and
- analysis of the characteristics of family planning users among whom fertility has declined.

Before we compare the fertility decline with the official family planning output, it is worth recalling one interesting aspect of the relationship between family planning practice and fertility. The relevant partial regressions (unstandardized) are reproduced below:

	Partial regression	
	B	F
Children ever-born	0.534	57.6
Children born, 1965-69	0.224	15.8
Children born, 1970-74	0.029[a/]	0.4
Children born, 1975-79	-0.106	10.3
Children born, 1979	-0.058	16.0

a. Statistically insignificant.

These data show that, on the whole, family planning practice and children ever-born are positively related. The relationship goes from fertility to family planning and not the other way around. High fertility women tend to adopt birth control methods. However, when the relationship is examined separately for births which took place in specific periods, the direction of the association changes from a significant positive value for births in 1965-69, to an insignificant relationship in 1970-74, and back to a significant but negative relationship for births in 1975-79 and 1979. In other words, the direction of the relationship seems to have been reversed in recent years, with birth control practice affecting fertility rather than the other way around. This provides one bit of evidence that the stronger, more recent official family planning efforts have made some dent on fertility in Kerala.

Fertility decline and family planning output. Table 9.22 shows the fertility level and the number of births averted by acceptance of the family planning methods, including sterilization, offered by the official program. A comparison for the three most recent five-year periods indicates that the two are negatively related; the rank correlation coefficient is -0.7, which is statistically significant for the nine observations.

Table 9.22 Marital fertility and births averted by district and time period, 1965-79

	Total marital fertility rate for ages 20-44 years		
Period	Palghat	Ernakulam	Alleppey
1965-69	6.24	6.63	6.52
1970-74	5.48	5.38	4.82
1975-79	4.96	4.65	4.59
	Births averted due to official family planning program		
1965-69	15,000	27,000	29,000
1970-74	33,000	139,000	61,000
1975-79	51,000	184,000	102,000

Using the service statistics regarding acceptors by method, estimates of the births averted by the official family planning program were obtained and compared with the decline in number of births. It appears that births averted were greater than the decline in each district. For the State as a whole, almost all of the reduction in the birth rate not attributable to an increase in age at marriage could be accounted for by family planning acceptance through the official program.

Comparison with Sri Lanka. Sri Lanka is similar to Kerala in its socioeconomic development. The relevant indicators are very close, but those of Kerala are systematically lower. The population density is much higher in Kerala, but it has a safety valve whereas Sri Lanka does not. Kerala is part of India, and its people can freely migrate throughout the country in search of economic opportunities. Sri Lanka is an island, and any movement out of it is restricted by the usual formalities of work permits, visas, exit permits, and so on. On balance, one would expect that if there were no government influence, these two populations would have more or less the same family planning use rates. If the rates were different, especially if they were lower in Sri Lanka, this could be attributed to differences in the official family planning programs.

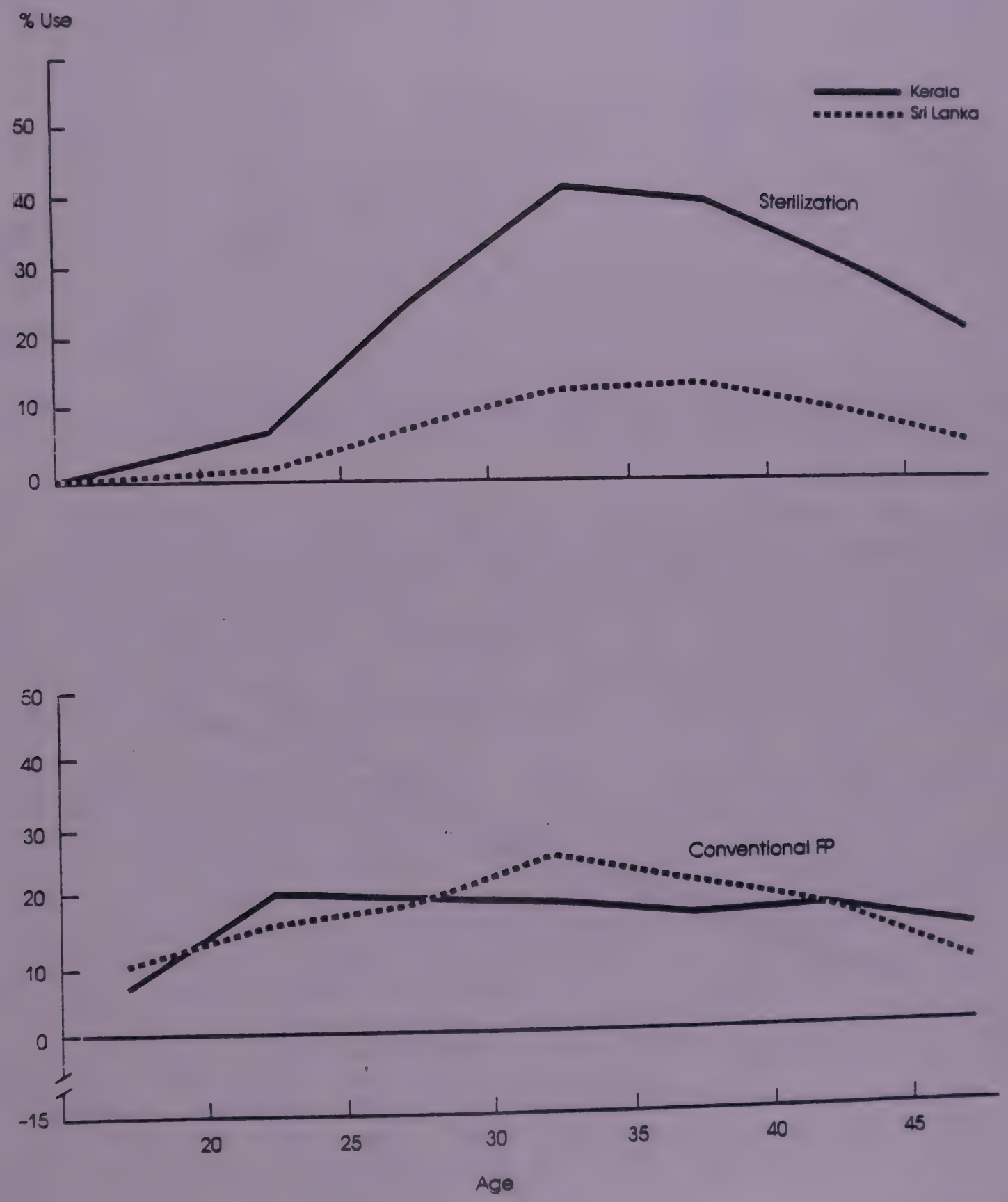
Figures 9.4 and 9.5 compare sterilization and conventional family planning rates in Kerala and Sri Lanka. The data for Kerala are from this study and refer to 1979. The data for Sri Lanka are taken from the World Fertility Survey and refer to 1975. Although later data are available for Sri Lanka, we have used the 1975 rates because they are not affected by the recent, more active nature of the official family planning program.

These figures indicate that the two populations have quite similar rates for conventional family planning practice, but very different rates for sterilization. If Kerala had no strong official program promoting sterilization, its sterilization rate would probably not have been very much different from that in Sri Lanka. We attribute the difference in sterilization rates to the official family planning program.

What was the consequence of this difference in sterilization rates on fertility levels in Kerala during 1975-79? The expected effect is a decline of 0.92 children per woman (Table 9.23). This was obtained by estimating the average number of children that would have been born to the women who were sterilized in Kerala in excess of the number sterilized in Sri Lanka, and then applying the fertility schedule of the sterilized women (Table 4.16) to all married women.[5/] The actual decline was 1.77 (Annex Table 4). Thus, about 52 percent of the marital fertility decline could be attributed directly to the official family planning program, while 48 percent of the decline would have taken place even if the government had not taken any initiative in limiting births.

5/ Which set of fertility schedules best measures the rates of the sterilized group is debatable. We have used the rates for the intermediate time period, a sort of average for the entire period under study, 1965-79.

Figure 9.4
STERILIZATION AND FAMILY PLANNING PRACTICE BY AGE, KERALA AND SRI LANKA



World Bank—24858

Figure 9.5

STERILIZATION AND FAMILY PLANNING PRACTICE BY EDUCATION, KERALA AND SRI LANKA

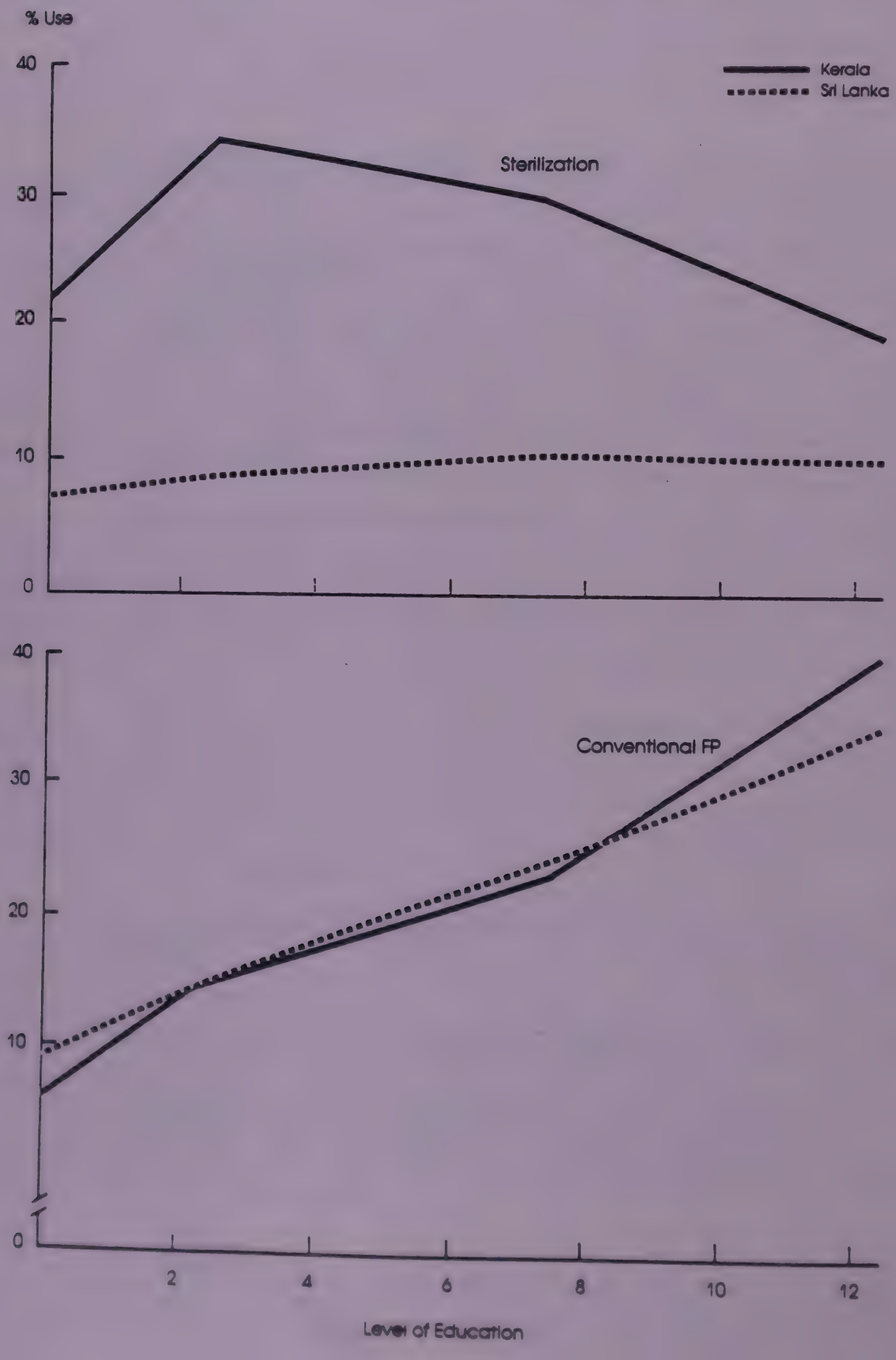


Table 9.23 Estimate of excess sterilization rate in Kerala

Age	Sterilization rate (percent) Kerala	Sri Lanka	Difference (a)	Kerala marital fertility rate, sterilized, 1970-74 (b)	(a)x(b)/100
15-19	1.1	0.5	0.6	200	1.2
20-24	7.1	1.9	5.2	419	21.8
25-29	26.1	8.1	18.0	281	50.6
30-34	42.0	12.9	29.1	207	60.2
35-39	40.5	13.9	26.6	112	29.8
40-44	33.0	10.3	22.7	71	16.1
45-49	21.5	5.5	16.0	24	3.8
All ages	27.9	8.9	19.0		0.9175

Note: 0.9175 = (1.2 + 21.8 + ...) x 5/1,000.

Source: Sterilization rates for Sri Lanka from World Fertility Survey, Sri Lanka, 1975, First Report, Table 4.3.1, p. 485.

Data from our survey indicate that about 30 percent of the fertility decline during 1968-78 was due to a decrease in the rate at which women were marrying (Annex Table 13). This has nothing to do with the government's family planning program; it is a response to socioeconomic changes. Combining these two, we may conclude that about 36 percent of the decline in the total fertility rate (.70 x .52) was due to the official program; the balance of 64 percent (.30 + [.48 x .70]) would have taken place because of the socioeconomic changes, irrespective of the official program.

Characteristics of acceptors. A third piece of evidence supporting the contribution of the official family planning program to Kerala's fertility decline involves the socioeconomic characteristics of the family planning and sterilization acceptors. In a population undergoing demographic transition without government input through family planning services, and particularly without financial incentives, birth control practice would, on the whole, be positively related to economic and social status. Those better educated, those richer, those with nonagricultural occupations would tend to limit births more than the illiterate, the poorer, the farmers. In Kerala, we did not see this pattern. Our data indicated that sterilization was most prevalent among women with 1-4 years of schooling, not among those with more than ten years of schooling (Figure 7.1); among the Ezawas and Scheduled Castes, not among the Nairs (Annex Table 19); and among women from households with a per capita monthly expenditure of Rs. 50-59, not among those with

monthly expenditures above Rs. 120 (Annex Table 15). We attribute this higher sterilization rate among the lower strata of society to the official official family planning program, and especially to its economic incentives. 6/

Thus, the Kerala Fertility Survey provided enough evidence to confirm the impact of the official family planning program on the marital fertility rate in the State, especially among women of the middle and lower classes. In the absence of such a program, the fertility decline in Kerala would have been only two-thirds of the actual decline.

6/ In a study made by the Demographic Research Centre, Trivandrum, in Palghat District, it was reported that "of the total acceptors 51% preferred mass vasectomy camp for greater monetary remuneration, 30% for the services of expert doctors,..." (Kerala State, Bureau of Economics and Statistics and Demographic Research Centre, 1977, p. 15).

Chapter 10. The Kerala Experience: Policy and Research Implications

Kerala has experienced one of the sharpest fertility declines in the South Asia region. With levels of income and nutrition among the lowest in the world, this Indian State has achieved results in controlling population growth comparable to those in the most successful middle-income countries. Our research was designed to uncover the reasons for this apparent anomaly. Having concluded our analysis, we may now ask whether population programs in the other States of India have anything to gain from heeding the lessons learned from a study of the fertility decline in Kerala.

Since Kerala's fertility decline was due as much to historical factors as to recent policy interventions, it is not entirely replicable in other parts of India. Nevertheless, some understanding of what happened in Kerala and why should prove useful in reorganizing the population programs elsewhere in the country.

An increase in age at marriage is a familiar prescription for fertility transition not only for India, but also for most other developing countries. All populations which have undergone fertility transitions started with an increase in the age at marriage. Kerala is no exception. About 30 percent of the fertility decline in Kerala during 1968-78 could be attributed to fewer married women at younger ages. During 1975-79 the average age at marriage was about 20 for the three survey districts. The difference between Kerala and all the other States of India is very large indeed. For example, if the proportions married in India in 1971 had been the same as in Kerala, the total fertility rate there would be lower by 20 percent. This is the direct consequence. There would, of course, be substantial indirect consequences as well, through increased adoption of family planning methods for example.

The potential for fertility reduction through increased age at marriage is very significant and is untapped so far in much of India. The Kerala study did not discover any easy way to delay the age at which women marry. Among the variables that can be manipulated, female education showed the strongest positive association with age at marriage. 1/ Thus, education seems the best way to ensure a higher age at marriage for Indian women.

The Kerala study indicated that about 60 percent of the decline in marital fertility during the past decade could be attributed to socioeconomic factors and the balance to the official family planning program. Even if Kerala did not have an official family planning program, the fertility rate in the State would have declined sharply. The principal socioeconomic factors responsible are reduced infant and child mortality and basic education, particularly among girls.

1/ For Kerala, the partial regression was +1.07 months: an increase of one year in female education raised the age at marriage by 1.07 months.

Kerala differs from the other States of India in many respects, but most notably in the case of health conditions and education. It would appear, therefore, that in order to encourage an increase in age at marriage and small family norms in the other States, measures should first be taken to reduce infant and child mortality and increase female education. Like increasing the age at marriage, these are well-known and oft-repeated policy recommendations supported by most studies on the determinants of fertility. The present study adds one more to the list. It also suggests how these policies might be implemented, particularly among the poor.

One way to improve the health and educational level of low-income families is to provide them the means to earn more and thus be in a position to buy better health and education. Kerala points to an alternate way of achieving these goals -- reduce the cost of these services and make them accessible to low-income families through a cheap transportation network. These are direct means of intervention to improve the level of education and health of low-income families. And the experience of Kerala shows that it will work.

Agrarian reforms including establishment of minimum wages, better working conditions, and land ceilings seem to have helped increase both the desire for smaller families and the demand for birth control in Kerala. Whether these redistribution policies can be implemented in the other States of India depends on the political will of the people to achieve a shift in political power from the rich to the poor, without which all such reforms will remain paper reforms having little effect on the lives of the people.

Kerala has yet to deal with a major obstacle in the path of fertility decline to replacement level. The average desired family size is 3.25, close to the total fertility rate in 1975-79. It is true that this average is relatively low compared to some of the African countries, but it is very much above replacement level. It is doubtful whether the average will decline very much further without some additional major socioeconomic reforms, particularly with respect to old age security. Most parents expect to live with and to be supported by their children when they are elderly. Indeed, they have no other real choice. So it is in their interest to make absolutely sure that they have enough surviving children to look after them during their later years. The desired family size, which took a big drop when the infant mortaility rate declined from over 150 to below 50 and when female literacy became universal among those of reproductive ages, will drop a second time only if couples know there is available to them some source of old age support other than their own children. The other States will face the same resistance once the first substantial decline in fertility has been achieved.

If the official program has succeeded in reducing fertility very significantly in Kerala, as we have been able to show that it has, why has it not been as successful in many other States? What is different about Kerala is not greater family planning inputs, at least not as measured by budgetary allotments. The success in Kerala is more likely due to a more efficient delivery of services and a higher spin-off effect -- that is, a higher interaction between family planning services and socioeconomic conditions. The

same level of family planning services as in other States has been more effective in Kerala because of the different socioeconomic conditions, especially lower mortality and higher female literacy.

Yet Kerala women do not have a very clear idea about the number of children they would like to have; this number is determined mainly by the number of children they already have. Even when women find that they have reached or exceeded their desired number of children (as reported by them), not all of them take steps to prevent additional births.

It is, therefore, neither a strong manifest demand for family planning services nor a strong desire for fewer children, but rather an effective delivery of family planning services aided by financial incentives, in conjunction with a weak dormant demand, that has made family planning acceptance as high as it is in Kerala.

A basic question that we cannot adequately answer is whether the family planning program in Kerala would have worked as well if the population were like that of the rest of India with respect to education, health, and so on. We do, however, have several clues to the answer. First, in Kerala a high economic status is neither a necessary nor a sufficient condition for acceptance of birth control methods. A strong family planning program like Kerala's (with financial incentives and emphasis on sterilization) can alter the normal relationship between fertility decline and socioeconomic status. Economic incentives are valued most by the poor, and hence, their family planning acceptance rate and fertility decline can be -- and in the case of Kerala are -- greater than those of the higher classes. Second, a strong family planning program can be bolstered by socioeconomic development efforts. The interdistrict comparisons derived from our survey show this pattern. Alleppey and Ernakulam districts are more advanced than Palghat, and the family planning acceptance rates are much lower in the latter district. In general there is a positive association between socioeconomic development and family planning acceptance. But the experience in other districts in India shows no similar relationship. The Kerala survey indicates that this association can be broken with suitable family planning delivery. Without the State's socioeconomic development, the family planning program would have succeeded to some extent, but the impact on fertility would have been less.

Finally, there are some lessons to be learned regarding future research on fertility declines in Kerala and elsewhere.

We began our study by hypothesizing that changes in Kerala's fertility were caused by increases in the age at marriage among all segments of the population and by increases in family planning usage among the middle class and the well-to-do. We therefore attempted to collect data that would throw light on the socioeconomic determinants of contraceptive behavior and of age at marriage.

Some of our original hypotheses were supported by the survey data, but others were contradicted by them. As a result, some of the data collected in the survey were not as useful as we had originally anticipated, while other data that would have been very useful were not collected at all.

The survey was designed in line with the assumption that the Kerala population is fairly homogeneous with respect to the determinants of fertility. Only three districts, which were not selected at random, were covered. The pace of fertility decline and the factors related to this decline proved, however, to be somewhat different in the Malabar districts (Palghat) than in those of Cochin (Ernakulam) and Travancore (Alleppey). A better basis for the sample population would have been a random selection of households from the entire State. The Muslim/non-Muslim comparison, for example, would have been very different if the sample had been selected this way.

The theoretical framework used to explain fertility decline depends heavily on the hypothesis of a relative increase in the cost-benefit ratio of children. At the time of the field survey, not enough emphasis was given to collecting information on factors related to either the costs or the benefits. Moreover, we assumed that in Kerala children are not employed outside the home, and that education is completely free. The survey showed, however, that 38 percent of children above the age of twelve have worked for wages, and that 96 percent of them gave their wages to the family. Similarly, although education is free to a great extent, the proportion of family income which parents spend on their children's education has increased. In future studies on the determinants of fertility, it would be very useful to collect information on the cost of children's education; the cost of children's medical care; children's economic activity; children's contributions to family income; and parents' dependence on their children during their old age for housing, subsistence, companionship, and other assistance. To obtain these data, it will be necessary to interview not only married women 15-49 years old and their husbands, but also older men and women.

A second factor which we would like to have studied more thoroughly is the change in the opportunity cost of mothers. How much did the rise in wages, increased employment opportunities, and improved working conditions for women matter to an individual and influence her preference for small families and her adoption of contraception?

Our attempts to explain fertility differences as well as the use or nonuse of contraceptives were only partially successful. Much more needs to be done in identifying relevant variables to explain differences among women and couples. The total variance in the use of family planning methods explained by socioeconomic factors was relatively small (less than 16 percent). The study attributed this low explanatory power of the model to the absence of program-related factors among the independent variables. Indeed, one of the major conclusions of this study is that the family planning program has an independent causal effect on desire for small families and acceptance of contraceptives. Inclusion of program-related variables such as access to family planning services, quality of services, intensity of motivational efforts, satisfaction with methods offered, community-level variables, and incentives and disincentives would have provided important data. Future studies on the determinants of fertility should try to collect information on these program-related variables either at the couple level or at the community level, and should include program effects in the models for explaining why individual couples do or do not choose to practice contraception.

A similar situation arose with respect to the determinants of infant and child mortality. The total variance explained by socioeconomic and demographic variables was very small. In this case, also, the reason for the low explanatory power of the regression model could be the absence of health service-related variables. The study did not collect information on maternal and child health (MCH) practices of women or on access to and utilization of health and medical services. In a situation like Kerala's where government medical services are relatively free and transportation cheap, variables related to the utilization of MCH and other medical services are perhaps more important than socioeconomic factors in explaining why a particular child dies in infancy and another survives.

Finally, this study placed particular emphasis on explaining the determinants of female age at marriage. Some very useful data were collected from married and unmarried women, as well as from married and unmarried men. In this respect, the present study is the first of its kind for Kerala. But it treated the age at marriage of girls as independent of the age at marriage of boys. This was a mistake. In the Kerala context, the age at marriage of a girl is determined not only by the socioeconomic characteristics of the girl and her family, but equally -- if not more so -- by socioeconomic and other factors related to the age at marriage of boys. If, for whatever reason, boys postpone their marriages to age 28 or 30, this will have a repercussion on the age at marriage of girls, irrespective of their desire to marry earlier or later. Thus, the factors that determine the age at marriage of boys are important determinants of the age at marriage of girls as well. In future studies, this linkage should be explicitly taken into consideration.

Annex Table 1 Population, density, and growth rate by district, Kerala

District [a/]	Population 1981 (thousands)	Density [b/] 1981	Growth (percent) 1971-81
Trivandrum	2,591	1,182	17.85
Quilon	2,807	608	16.35
Alleppey	2,343	1,244	10.21
Kottayam	1,681	763	9.23
Idukki	971	192	26.85
Ernakulam	2,533	1,052	17.08
Trichur	2,437	804	14.48
Palghat	2,042	465	21.16
Malappuram	2,401	654	29.35
Kozhikode	2,243	969	23.12
Cannanore	2,800	565	25.24
Wynad	553	260	33.71
Kerala	25,403	654	19.00

Note: District populations do not add to State total of 25,403,000 due to rounding error.

a. The number of districts has since been increased to 14 by the creation of Pathanamthitta District in 1982 (out of Quilon and Alleppey Districts) and Kasaragod District in 1983 (out of Cannanore District).

b. Density is expressed as number of people per square kilometer.

Source: Government of Kerala, Director of Census Operations, 1981, Census of India 1981, Kerala, Series 10, Provisional Population Totals, Paper 1 of 1981, Table 1.

Annex Table 2 Expenditures on Family Welfare Program, Kerala, 1952-80 (Rs.)

Year	Administration	Rural & urban family welfare service	Mass education	Construction	Compensation (incentives)	Transport	Others	Total
1952-59	11,125	65,466	117,206	..	..	..	..	193,797
1959-60	19,994	157,211	108,849	..	..	..	..	266,054
1960-61	7,885	234,882	75,099	..	..	..	..	317,866
1961-62	264	260,129	315	..	..	..	..	260,708
1962-63	2,594	447,102	5,790	..	..	..	2,075	457,741
1963-64	2,697	1,089,143	26,196	..	..	..	231,438	1,349,474
1964-65	40,138	3,107,466	19,121	..	..	..	490,121	3,656,846
1965-66	134,303	5,918,797	65,572	..	..	..	10,012	6,128,684
1966-67	63,916	8,134,551	459,972	..	..	..	..	8,658,439
1967-68	166,035	12,152,833	440,071	912,851	..	..	459,960	14,131,750
1968-69	193,303	15,373,027	448,263	1,496,031	..	..	960,095	18,470,719
1969-70	218,551	17,166,098	489,594	106,637	..	..	947,580	18,928,460
1970-71	218,650	19,996,686	789,603	808,696	..	..	929,352	22,742,987
1971-72	1,629,047	15,100,844	2,185,186	779,561	7,709,751	1,688,877	4,334,767	33,428,033
1972-73	1,799,341	16,563,638	3,618,424	2,356,238	3,353,043	1,340,863	3,710,915	32,742,462
1973-74	1,709,354	17,115,900	4,444,439	2,275,430	1,320,327	936,272	2,674,307	26,476,029
1974-75	1,991,052	18,628,830	667,062	1,419,655	1,877,285	804,987	2,507,808	27,896,679
1975-76	2,327,259	22,024,368	241,670	971,510	9,156,450	1,056,891	3,825,628	39,603,776
1976-77	2,380,301	23,388,071	211,782	676,954	30,916,648	1,326,338	4,493,816	63,393,910
1977-78	2,447,235	23,537,559	184,355	192,355	10,286,870	1,245,198	5,315,485	43,209,057
1978-79	2,467,692	25,342,940	686,213	46,485	10,191,054	1,532,620	5,985,539	46,252,543
1979-80	2,679,455	27,632,474	790,868	1,757,079	15,041,220	1,278,285	6,375,177	55,554,558

Source: Based on annual reports of the Government of Kerala, State Department of Health, State Family Welfare Bureau.

Annex Table 3 Number of births averted due to use of family planning methods, Kerala, 1957-80

Year	Method		Total	Method		Total
	Vasectomy	Tubectomy		IUD	CC a/	
1957	18	10	28	-	-	28
1958	181	140	321	-	-	321
1959	647	598	1,245	-	-	1,245
1960	1,558	1,164	2,722	-	-	2,722
1961	2,194	1,693	3,887	-	-	3,887
1962	2,899	2,392	5,291	-	-	5,291
1963	3,872	3,030	6,902	-		6,902
1964	6,296	3,667	9,963	-	-	9,963
1965	10,693	4,663	15,356	975	-	16,331
1966	18,397	6,105	24,502	6,106	37	30,645
1967	25,428	7,633	33,061	12,328	445	45,834
1968	35,684	10,195	45,879	15,693	1,337	62,909
1969	47,333	13,575	60,908	18,688	1,383	80,979
1970	53,694	17,704	71,398	20,101	1,515	93,014
1971	67,392	22,516	89,908	19,865	1,239	111,012
1972	81,221	28,303	109,524	17,781	972	128,277
1973	90,979	35,469	126,448	16,610	883	143,941
1974	107,534	43,760	151,294	15,255	1,721	168,270
1975	89,639	53,311	142,950	15,740	2,070	160,760
1976	105,899	56,288	162,187	15,493	3,190	180,870
1977	129,149	85,049	214,198	15,141	5,087	234,426
1978	125,416	101,259	226,675	12,839	3,502	243,016
1979	118,777	115,777	234,554	11,370	N.A.	245,924
1980	112,534	132,184	244,718	10,904	N.A.	255,622

Note: N.A. - not applicable.

a. CC - conventional contraceptives.

Source: Kerala State, Population Research Centre, Directorate of Economics and Statistics, 1980, "Note on the Calculation of Births Averted and Couples Protected Due to Family Welfare Programme in Kerala" (unpublished).

Annex Table 4 Age-specific marital fertility rates, three districts combined, Kerala
(per thousand population)

Age	1965-70	1970-75	1975-80	Percent decline 1965-70 to 1975-80
15-19	201	206	200	0.5
20-24	375	334	333	11.2
25-29	344	292	280	18.6
30-34	255	213	162	36.5
35-39	198	127	106	46.5
40-44	(99)	74	49	51.5
45-49	(24)	(18)	12	50.0
TMFR	7.48	6.32	5.71	24.0

Note: Numbers in parentheses are estimates.

Annex Table 5 Age- and period-specific fertility rates for five-year intervals from 1945 to 1980, three districts combined, Kerala

Age of woman at time of birth of child	Age-specific rates (per thousand)						
	1945-50	1950-55	1955-60	1960-65	1965-70	1970-75	1975-80
15-19	82	76	93	62	52	37	22
20-24	--	269	301	302	269	219	176
25-29	--	--	299	316	313	253	235
30-34	--	--	--	260	242	200	146
35-39	--	--	--	--	189	121	100
40-44	--	--	--	--	--	70	47
45-49	--	--	--	--	--	--	11

Annex Table 6 Distribution of married women by age at marriage and education, and standardized fertility rates, three districts combined, Kerala

Age at marriage	Years of schooling					Cumulative marital fertility
	None	1-4	5-9	10+	All	
Under 15	132	98	75	4	309	6.02
15-19	359	511	553	92	1,515	6.02
20-24	108	183	294	124	709	5.04
25-29	15	20	41	49	125	3.43
30-34	2	7	5	5	19	2.09
35-39	-	1	1	-	2	1.05
40-44	-	-	-	-	-	-
45-49	-	-	-	-	-	-
Total	616	820	969	274	2,679	
Fertility rate						
Actual	5.8	5.7	5.1	4.4	5.6	
Expected	5.8	5.7	5.6	5.0	5.6	

Annex Table 7 Marital fertility rate by age and education, three districts combined, Kerala

Age group	Years of schooling			
	None	1-4	5-9	10+
	1965-70			
20-24	350	400	384	281
25-29	319	357	373	271
30-34	259	257	241	294
35-39	227	201	157	133
40-44	(92)	(136)	(97)	(27)
TMFR'	6.235	6.755	6.260	5.030
	1970-75			
20-24	353	322	330	354
25-29	279	297	286	339
30-34	240	195	202	228
35-39	141	130	106	136
40-44	77	80	55	94
TMFR'	5.450	5.120	4.620	5.755
	1975-80			
20-24	266	335	354	299
25-29	266	263	306	254
30-34	210	155	143	149
35-39	154	77	94	94
40-44	63	52	38	19
TMFR'	4.795	4.410	4.675	4.075

Notes: TMFR' - total marital fertility rate for ages 20-44 years.

Figures in parentheses are estimates.

Annex Table 8 Marital fertility rate by caste, three districts combined, Kerala

Caste	TMFR' 1965-70	1970-75	1975-80
Nairs	4.935	4.270	4.185
Ezawas	6.310	5.085	4.345
Scheduled Castes	6.375	5.070	4.845
Christians	6.790	5.605	5.030
Muslims	6.730	5.930	5.415

Note: TMFR' - total marital fertility rate for ages 20-44 years.

Annex Table 9 Percent decline in fertility rate by household expenditures, three districts combined, Kerala

Fertility measure	Monthly per capita household expenditures Rs. 0-59	Rs. 60-120	Rs. 120+
TMFR'			
1968-73	16	24	11
1973-78	8	17	12
1968-78	23	38	22
Fertility rate, 20-29 years			
1968-73	-2	7	2
1973-78	11	18	3
1968-78	9	24	4
Fertility rate, 30-44 years			
1968-73	21	34	33
1973-78	21	36	24
1968-78	38	67	48

Note: TMFR' - total marital fertility rate for ages 20-44 years.

Annex Table 10 Marital fertility rate by household expenditures, three districts combined, Kerala

Household expenditures	TMFR'		
	1965-70	1970-75	1975-80
Rs. 0-59	6.975	5.850	5.385
Rs. 60-120	6.485	4.855	4.040
Rs. 120+	4.405	3.925	4.435

Note: TMFR' - total marital fertility rate for ages 20-44 years.

Annex Table 11 Marital fertility rate by ownership of land, three districts combined, Kerala

Land owned (cents) a/	TMFR'		
	1965-70	1970-75	1975-80
0-10	6.740	5.260	4.630
11-49	6.470	5,280	4.550
50-99	6.450	4.630	4.585
100+	6.125	5.330	4.795

	Percent decline		
	1968-73	1973-78	1968-78
0-10	22	12	31
11-49	18	14	30
50-99	28	1	29
100+	13	10	22

Note: TMFR' - total marital fertility rate for ages 20-44 years.

a. One cent equals 1/100th of an acre.

Annex Table 12: Percentage of nonusers of family planning by fertility status, age, and parity, three districts combined Kerala

Age	Excess fertility	Par fertility	Deficit fertility
25-29	35	32	75
30-34	38	27	65
35-39	39	34	72
40-44	43	47	88
45-49	58	63	97
All ages	45	40	76

Parity	Excess fertility	Par fertility	Deficit fertility
3	27	34	75
4	36	45	67
5	41	45	88
6	52	55	75
7	59	63	100
8+	56	59	100
All parities	45	40	70

Annex Table 13 Analyis of fertility change due to the marriage factor, 1965-70 to 1975-80, three districts combined, Kerala

Age	Actual fertility rates 1965-70	1970-75	Decline	Expected rates if marriage rates alone changed	Change due to marriage factor	Change due to fertility factor
1965-70 to 1970-75						
15-19	52	37	-15	36	-16	+ 1
20-24	269	219	-50	246	-23	-27
25-29	313	253	-60	298	-15	-45
30-34	244	200	-42	240	- 2	-40
35-39	189	121	-68	189	+ 1	-68
40-44	93	70	-23	93	-	-23
45-49	23	17	- 6	23	-	- 6
TFR	5.91	4.59	-1.32	5.63	-0.28	-1.04
1970-75 to 1975-80						
	1970-75	1975-80				
15-19	37	22	-15	23	-14	- 1
20-24	219	176	-43	177	-42	- 1
25-29	253	235	-18	245	- 8	-10
30-34	200	146	-54	192	- 8	-46
35-39	121	100	-21	120	+ 1	-22
40-44	70	47	-23	71	- 1	-22
45-49	17	11	- 6	17	-	- 6
TFR	4.59	3.69	-0.90	4.23	-0.36	-0.54
1965-70 to 1975-80						
	1965-70	1975-80				
15-19	52	22	-30	23	-29	-1
20-24	269	176	-93	199	-70	-23
25-29	313	235	-78	289	-24	-54
30-34	242	146	-96	230	-12	-84
35-39	189	100	-89	187	- 2	-87
40-44	93	47	-46	95	+ 2	-48
45-49	23	11	-12	23	-	-12
TFR	5.91	3.69	-2.22	5.23	-0.675	-1.545

Note: TFR = total fertility rate.

Annex Table 14 Percentage of ever-married women by family planning method and age at marriage, three districts combined, Kerala

Age at marriage	Conventional methods: Currently using	Conventional methods: Used in the past	Conventional methods: Ever used	Sterilized	Currently using or sterilized	Never used
Under 15	10.8	12.0	22.9	22.6	33.4	54.5
15-16	15.2	14.3	29.6	32.3	47.6	38.1
17-18	17.0	15.9	32.9	31.9	48.8	35.2
19-20	19.8	17.5	37.4	27.7	47.5	34.9
21-22	24.3	17.0	41.3	22.7	47.0	36.0
23+	29.6	13.0	42.8	21.7	51.3	35.5
All	18.7	15.3	33.9	27.8	46.5	38.2

Note: The inconsistencies in the final row of Annex Tables 14 through 19 are due to small differences in the size of the sample.

Annex Table 15 Percentage of ever-married women by family planning method and household expenditures, three districts combined, Kerala

Monthly per capita household expenditures (Rs.)	Conventional methods: Currently using	Conventional methods: Used in the past	Conventional methods: Ever used	Sterilized	Currently using or sterilized	Never used
0-30	6.5	6.5	13.0	21.4	27.9	65.6
30-49	13.7	11.2	25.0	27.0	40.7	48.0
50-59	16.2	13.5	29.7	32.6	48.8	37.6
60-79	16.1	18.7	34.8	31.5	47.6	33.7
80-119	27.2	17.5	44.7	30.0	57.2	25.2
120+	33.4	24.8	58.3	18.1	51.6	23.6
All	18.5	15.2	33.8	27.6	46.2	38.8

Annex Table 16 Percentage of ever-married women by family planning method and landownership, three districts combined, Kerala

Land-ownership (cents) [a/]	Conventional methods			Sterilized	Currently using or sterilized	Never used
	Currently using	Used in the past	Ever used			
0-5	15.5	16.3	26.3	27.3	42.9	46.4
6-10	16.4	12.2	28.6	30.3	46.6	41.2
11-49	18.4	17.4	35.7	28.9	47.3	35.3
50-99	16.6	16.6	33.2	30.1	46.7	36.7
100+	23.0	16.9	39.9	24.5	47.5	35.6
All	18.7	15.3	34.0	27.8	46.5	38.2

a. One cent = 1/100th of an acre.

Annex Table 17 Percentage of ever-married women by family planning method and age, three districts combined, Kerala

Age	Conventional methods			Sterilized	Currently using or sterilized	Never used [a/]
	Currently using	Used in the past	Ever used			
15-19	7.8	6.7	14.4	1.1	8.9	84.4
20-24	21.1	11.0	32.1	7.1	28.2	60.8
25-29	21.3	15.2	36.6	26.1	47.4	37.3
30-34	19.5	18.1	37.6	42.0	61.5	20.4
35-39	18.2	17.1	35.3	40.5	58.7	24.1
40-44	19.1	16.9	36.0	33.0	52.1	31.0
45-49	15.5	14.1	29.6	21.5	37.0	48.9
All	18.8	15.2	34.0	27.8	46.7	38.1

a. Minimum estimate; some women who had used conventional family planning were later sterilized.

Annex Table 18 Percentage of ever-married women by family planning method and parity, three districts combined, Kerala

Parity	Conventional methods: Currently using	Conventional methods: Used in the past	Conventional methods: Ever used	Steril-ized	Currently using or steril-ized	Never used [a/]
0	4.3	7.0	11.3	-	4.3	88.7
1	24.9	9.3	34.2	3.7	28.6	62.1
2	29.0	16.5	45.5	26.2	55.2	28.3
3	17.9	21.2	39.2	44.2	62.1	16.6
4	16.4	19.9	36.3	42.1	58.5	21.6
5	16.8	15.4	32.1	40.0	56.8	27.9
6	14.6	15.6	30.2	31.7	46.3	38.0
7	9.3	16.3	25.6	29.5	38.8	45.0
8	14.9	14.9	29.7	28.7	43.6	41.6
9	22.8	5.3	28.1	28.1	50.9	43.9
10+	16.3	7.0	23.3	13.9	30.2	62.8
All	18.7	15.3	33.9	27.8	46.5	38.2

a. Minimum estimate; some women who had used conventional family planning were later sterilized.

Annex Table 19 Percentage of ever-married women by family planning method and caste, three districts combined, Kerala

Caste	Conventional Methods: Currently using	Conventional Methods: Used in the past	Conventional Methods: Ever used	Steril-ized	Currently using or steril-ized	Never used
Scheduled Castes/ Tribes	9.3	10.8	20.1	29.0	38.3	50.9
Nairs	24.5	20.2	44.7	24.2	48.7	31.1
Ezawas	14.8	14.1	28.9	32.4	47.2	38.7
Syrian Christians	32.1	23.4	55.5	33.2	65.3	11.2
Latin Christians	32.3	17.3	49.6	26.8	59.1	23.6
Muslims	10.4	11.3	21.7	20.0	30.4	58.3
Other	15.3	11.0	26.4	24.6	40.0	49.0
All	18.5	15.2	33.8	27.6	46.2	38.6

BIBLIOGRAPHY

Ayar, S. Ramanath. 1923. Progressive Travancere, Trivandrum: The Anatha Rama Varma Press.

Coale, Ansley J., and Paul Demeney. 1966. Regional Model Life Tables and Stable Populations, Princeton, New Jersey: Princeton University Press.

Freedman, Ronald. 1979. "Theories of Fertility Decline: A Reappraisal," Social Forces 58(1): 1-17.

Government of India, Central Bureau of Health Intelligence. 1981. Pocket Book of Health Statistics of India 1980, Coimbatore: Government of India Press.

Government of India, Central Statistical Organization, n.d. National Sample Survey Report No. 89 (NSS 14th Round), New Delhi: National Sample Survey Organization, Ministry of Planning, Government of India.

Government of India, Department of Family Welfare. 1979. Family Welfare Programme in India, Year Book 1978-79, New Delhi: Mass Mailing Unit, Department of Family Welfare.

Government of India, Registrar General and Census Commissioner. 1971. Census of India, Part II-A, Census Tables on Population, New Delhi: Government of India Press.

_____. 1981. Census of India, 1981, Provisional Population Totals, Series-1, Papers 1 and 2, India, New Delhi: Pearl Offset Press.

_____. 1983. Census of India, 1981, 1981, Series-1, Paper 2 of 1983, Paper 2 of 1983, "Key Population Statistics Based on 5 Percent Sample Data," New Delhi: A. J. Printers.

Government of India, Vital Statistics Division, Ministry of Home Affairs, 1966-81. "Sample Registration Bulletin," volumes for 1966-81, New Delhi: Office of the Registrar General.

Government of Kerala. 1978. Report of the Committee for Evaluation of Family Welfare Programme (Kerala), Shoranur: Government Press.

Government of Kerala, Director of Census Operations. 1972. Census of India, 1971, Series-9, Kerala, Part II-A, General Population Tables, New Delhi: Government of India Press.

_____. 1981. Census of India, 1981, Kerala, Series 10, Provisional Population Totals, Paper 1 of 1981, Cochin: Text Book Press.

Government of Kerala, Directorate of Economics and Statistics. 1980. Statistics for Planning 1980, Cochin: Text Book Press.

India Today, March 31, 1983.

Jeffrey, Robin. 1976. The Decline of Nayar Dominance, New Delhi: Vikas.

Kerala State, Bureau of Economics and Statistics and Demographic Research Centre, Trivandrum. 1977. "An Assessment of the Camp Performance and the Unprotected Couples in Palghat District after the Mass Camp," D.R.C. Paper No. 92, Trivandrum: Government Press.

Kerala State, Population Research Centre, Directorate of Economics and Statistics. 1980. "Note on the Calculation of Births Averted and Couples Protected Due to Family Welfare Programme in Kerala," Trivandrum: Population Research Centre (unpublished).

Krishnan, T.N. 1976. "The Demographic Transition in Kerala: Facts and Factors," Economic and Political Weekly 11:1203-1224.

Kurup, R.S., and S. Cecil. 1976. "A Note on Birth and Death Rates in Kerala Sample Registration Report," Series No. 11, Demographic Research Centre, Trivandrum: Bureau of Economics and Statistics (October), mimeographed.

Mencher, Joan P. 1980. "The Lessons and Non-Lessons of Kerala: Agricultural Labourers and Poverty," Economic and Political Weekly, Special Number, October, pp. 1781-1802.

Menon, A. Sreedhara. 1979. Social and Cultural History of Kerala, New Delhi: Sterling Publishers.

Nag, Moni. 1981. "Impact of Social Development and Economic Development on Mortality: A Comparative Study of Kerala and West Bengal," The Population Council, Center for Policy Studies, Working Paper No. 78, New York: The Population Council.

Nagam Aiya, V. 1906. The Travancore State Manual, Trivandrum: Travancore Government Press.

Nair, P. R. Gopinathan. 1974. "Decline in Birth Rate in Kerala: A Hypothesis about the Interrelationship between Demographic Variables, Health Services and Education," Economic and Political Weekly 9:323-336.

Nortman, Dorothy L., and Ellen Hofstatter. 1978. Population and Family Programs, Ninth Edition, New York: The Population Council.

Panikar, P.G.K. 1980. "Inter-Regional Variation in Calorie Intake," Economic and Political Weekly, Special Number, October, pp. 1803-1813.

Ratcliffe, John. 1978. "Social Justice and the Demographic Transition: Lessons from India's Kerala State," International Journal of Health Services 8(1): 123-144.

Sri Lanka, Department of Census and Statistics. 1978. World Fertility Survey, Sri Lanka, 1975, First Report, Colombo: Ministry of Plan Implementation (March).

United Nations. 1981. World Population Prospects as Assessed in 1980, Population Studies No. 78, New York: United Nations.

United Nations, Department of Economic and Social Affairs. 1975. Poverty, Unemployment and Development Policy: A Case Study of Selected Issues with Reference to Kerala, ST/ESA/39, New York: United Nations.

Vaessen, Martin. 1980. "Knowledge of Contraceptive Methods," WFS Comparative Studies, No. 8, London: World Fertility Survey and International Statistical Institute.

World Bank. 1980. World Development Report, 1980, New York: Oxford University Press.

Zachariah, K. C., and Sulehka Patel. 1983. "Trends and Determinants of Infant and Child Mortality in Kerala," Janasamkhya, University of Kerala, Trivandrum, No. 1, December.

PUBLICATIONS BASED ON THE RESEARCH ON DETERMINANTS OF FERTILITY IN SRI LANKA AND SOUTH INDIA

(RPO 670-71)

Research Reports (PHN Technical Notes)

1. Anomaly of the Fertility Decline in Kerala
by K. C. Zachariah.
PHN Technical Notes, RES 2 (1983), being published as a Staff Working Paper.

2. Determinants of Fertility Decline in Karnataka
by N. Baskara Rao, P. M. Kulkarni, and P. Hanumantha Rayappa.
PHN Technical Notes, RES 6 (1983).

3. Determinants of Recent Fertility Decline in Sri Lanka
by N. Krishnan Namboodiri, W. A. A. S. Peiris, H. R. Gunasekara, Soma Perera, Sulekha Patel, and Kathie W. Ladd.
PHN Technical Notes, RES 5 (1983).

4. A Comparative Analysis of the Determinants of Fertility Decline in Sri Lanka and South India
by K. C. Zachariah and B. Newlon with contributions by N. Krishnan Namboodiri, N. Baskara Rao, W. A. A. S. Peiris, P. M. Kulkarni, P. Hanumantha Rayappa, H. R. Gunasekara, Soma Perera, Sulekha Patel, and Kathie W. Ladd.
PHN Technical Notes, RES 10 (1983).

PHRD Working Papers

1. "Anomaly of the Fertility Decline in Kerala: Social Development, Agrarian Reforms, or Family Planning Program"
by K. C. Zachariah, Population and Human Resources Division, World Bank.
Working Paper No. 81-17, May 1981.

2. "Trends and Determinants of Infant and Child Mortality in Kerala"
by K. C. Zachariah, Population and Human Resources Division, World Bank.
Working Paper No. 82-2, January 1982.

3. "Determinants of Fertility in Sri Lanka"
by Krishnan Namboodiri, Population and Human Resources Division, World Bank.
Working Paper No. 81-53, September 1981.

4. "Age at Marriage in Sri Lanka"
by Krishnan Namboodiri, Population and Human Resources Division, World Bank.
Working Paper No. 81-54, October 1981.

Publications in Seminar Proceedings, Journals, etc.

1. "Determinants of Fertility Decline in Kerala"
by K. C. Zachariah and R. S. Kurup.
Published in the Proceedings of the Oxford Conference on India's Population, December 1982.

2. "Land Reforms and Fertility Decline in Kerala"
by K. C. Zachariah.
Demography India, XII No. 2 (1983), New Delhi.

3. "Trends and Determinants of Infant and Child Mortality in Kerala"
by K. C. Zacharaiah and Sulekha Patel.
Janasamkhya, a journal in demography published by the Kerala University, Trivandrum. Forthcoming.

4. "Anomaly of the Fertility Decline in Kerala"
by K. C. Zachariah.
Populai, Vol. 10N4 (1983), UNFPA, New York.

World Bank Publications of Related Interest

The African Trypanosomiases: Methods and Concepts of Control and Eradication in Relation to Development

C. W. Lee and J. M. Maurice

Here is a practical cost-benefit approach to an age-old problem affecting humans and livestock alike, the African Trypanosomiases. Describes new techniques that offer tsetse control without destroying game animals. Also summarizes current research in genetic control, the use of traps and screens, attractants, and pheromones.

Technical Paper No. 4. 1983. 107 pages.

ISBN 0-8213-0191-8. Stock No. BK 0191. $5.

Analyzing the Impact of Health Services: Project Experiences from India, Ghana, and Thailand

Rashid Faruqee

Staff Working Paper No. 546. 1982. 44 pages.

ISBN 0-8213-0117-9. Stock No. WP 0546. $3.

NEW

Child and Maternal Health Services in India: The Narangwal Experiment

What can primary health care and family planning do for women and children in the poor and deprived areas of the world? Some of the most specific evidence available today to support the benefits of these services is contained in these two studies, which represent the findings of research carried out during 1967-74 in twenty-six villages in Punjab, India.

Members of the research staff, which started with 15 people and grew to about 150 by the end of the project, spent many years working with, and sharing the lives of, villagers. The depth of understanding that came from this type of sharing enhances the value of these findings and provides valuable insights into possibilities for implementing mass programs for needy people in villages throughout the world.

Volume 1: Integrated Nutrition and Health Care

Arnfried A. Kielmann and others

This volume provides detailed data suggesting that synergism between malnutrition and infection is probably the greatest cause of mortality, morbidity, and retarded growth and development in children. In an experiment over a period of four years, villagers received nutrition care, general health care to control infections, or both. Dramatic improvements, including a 40%-50% decline in mortality, a 20% reduction in duration of morbidity, and increases in height and weight. In addition, detailed information on costs is presented that permits the most complete analysis of cost-effectiveness and program relevant costs and benefits yet available in this kind of field research. The study focuses directly on practical program implications and ways in which such integrated services can be applied under field conditions.

The Johns Hopkins University Press. 1984. 288 pages.

LC 82-23915. ISBN 0-8018-3064-8. Stock No. JH 3064. $24.50.

Volume II. Integrated Family Planning and Health Care

Carl E. Taylor and others

To village people, politicians, and international health planners, health and family planning have always seemed to fit naturally together. But in the early 1960s, when international awareness of the social and economic consequences of surging population growth moved family planning into a position of high priority, some international agencies began to advocate separation of family planning from health services. In international policy discussions the question continues to be important. This volume analyzes this question and provides arguments and evidence to support integration of health care and family planning; it outlines the purposes underlying the research in this area; and it proposes policy questions regarding the effectiveness, efficiency, and equity of such an integration.

The Johns Hopkins University Press. 1984. 256 pages.

LC 83-23915. ISBN 0-8018-2830-9. Stock No. JH 2830. $22.50.

Demographic Aspects of Migration in West Africa—

K. C. Zachariah and others

Volume 1

Staff Working Paper No. 414. September 1980. 369 pages (including statistical annexes, bibliography).

Stock No. WP 0414. $15.

Volume 2

Staff Working Paper No. 415. September 1980. 391 pages (including statistical annexes, bibliography).

Stock No. WP 0415. $15.

(These Working Papers are background studies for Migration in West Africa: Demographic Aspects, *described in this section.)*

Economic Motivation versus City Lights: Testing Hypotheses about Inter-Changwat Migration in Thailand

Fred Arnold and Susan H. Cochrane

Staff Working Paper No. 416. September 1980. 41 pages (including footnotes, references).

Stock No. WP 0416. $3.

Experiments in Family Planning: Lessons from the Developing World

Roberto Cuca and Catherine S. Pierce

A comprehensive review of experimental efforts in the developing world to determine more effective ways of providing family planning services.

The Johns Hopkins University Press, 1978. 276 pages (including bibliography, index of experiments).

LC 77-16596. ISBN 0-8018-2013-8, Stock No. JH 2013, $19.50 hardcover; ISBN 0-8018-2014-6, Stock No. JH 2014, $8.95 paperback.

Family Planning Programs: An Evaluation of Experience

Roberto Cuca

Staff Working Paper No. 345. 1979. 146 pages (including 2 annexes, references).

Stock No. WP 0345. $5.

Fertility and Education: What Do We Really Know?

Susan H. Cochrane

A model identifying the many channels through which education might

Prices subject to change without notice and may vary by country.

to determine fertility and a review the evidence of the relation between ucation and the intervening varia- es in the model that affect fertility.

e Johns Hopkins University Press, 1979. 3 pages (including bibliography, index).

78-26070. ISBN 0-8018-2140-1, Stock JH 2140, $6.95 paperback.

rtility and Its Regulation in ngladesh

Amin and Rashid Faruqee

ff Working Paper No. 383. 1980. 54 es (including references).

ck No. WP 0383. $3.

ealth

edrick Golladay, coordinating thor

ws on experience gained from lth components of seventy World nk projects in forty-four countries ween 1975 and 1978. Emphasizes disproportionately high expendi- es incurred on curative medicine, intenance of expensive hospitals, l sophisticated training of medical sonnel at the cost of preventive e for the majority of the people. nts out that low-cost health care tems are feasible and recommends t the Bank begin regular and direct ding for health, in addition to hav- health components as part of pro- s in other sectors.

or Policy Paper. 1980. 90 pages (in- ling 8 annexes, 4 figures, map).

ck Nos. BK 9066 (Arabic), BK 9067 glish), BK 9068 (French), BK 9069 anish). $5.

Health Issues and Policies in the Developing Countries

Fredrick Golladay

Staff Working Paper No. 412. 1980. 55 pages.

Stock No. WP 0412. $3.

Health, Nutrition, and Family Planning in India: A Survey of Experiments and Special Projects

Rashid Faruqee and Ethna Johnson

Staff Working Paper No. 507. 1982. 108 pages (including references).

Stock No. WP 0507. $5.

Infant and Child Mortality as a Determinant of Fertility: The Policy Implications

Susan Hill Cochrane and K. C. Zachariah

An illustrative analysis that suggests infant mortality may be an important component of a fertility reduction program in countries where mortality is high and few couples are able to have the number of surviving children they desire.

World Bank Staff Working Paper No. 556. 1983. 44 pages.

ISBN 0-8213-0147-0. Stock No. WP 0556. $3.

Integrating Family Planning with Health Services: Does It Help?

Rashid Faruqee

Staff Working Paper No. 515. 1982. 47 pages.

ISBN 0-8213-0003-2. Stock No. WP 0515. $3.

Kenya: Population and Development

(See description under Country Studies listing.)

Migration in West Africa: Demographic Aspects

K. C. Zachariah and Julien Conde

The first study of the large-scale movement of people in nine West African countries. Discusses the volume and direction of internal and external flows and the economic and social characteristics of migrants.

A joint World Bank-OECD study. Oxford University Press, 1981. 166 pages (including 22 maps, bibliography, index).

LC 80-21352. ISBN 0-19-520186-8, Stock No. OX 520186, $19.95 hardcover; ISBN 0-19-520187-6, Stock No. OX 520187, $8.95 paperback.

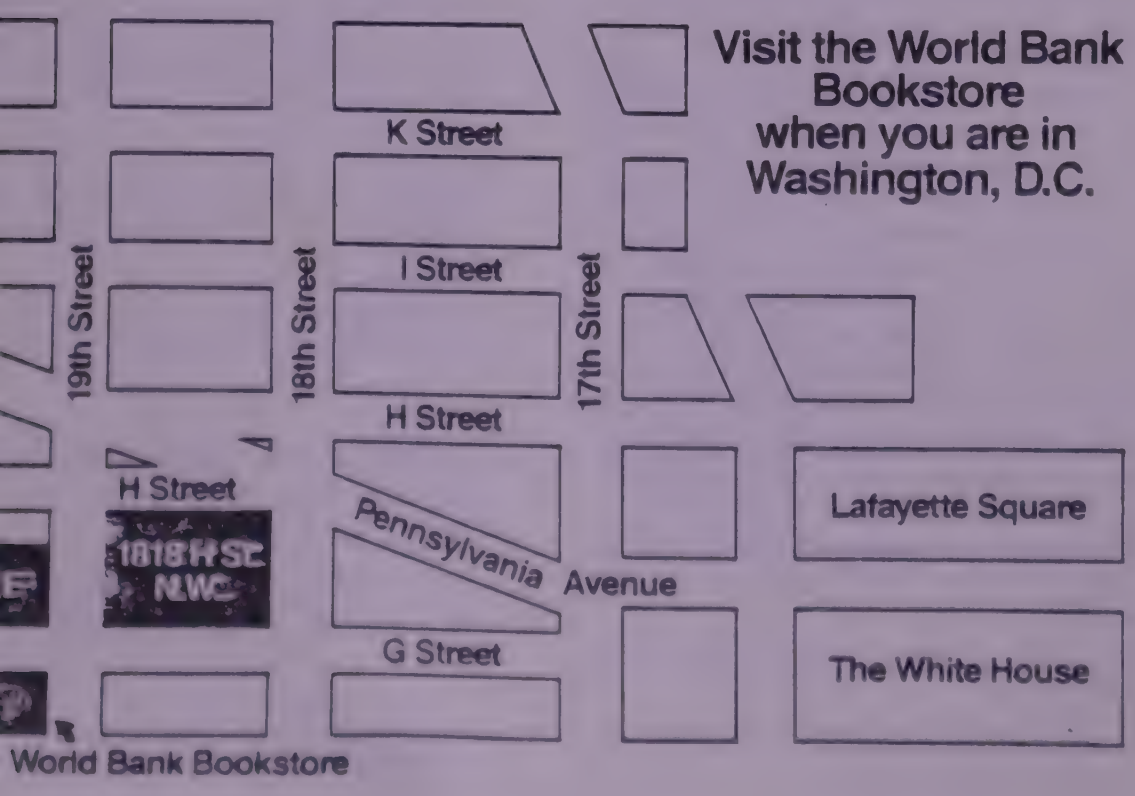
Population and Family Planning in Bangladesh: A Study of the Research

Mohammad Alauddin and Rashid Faruqee

Reviews major studies on family planning and on fertility trends, profiles, and determinants. Evaluates results of such studies and critiques their methodology and application. Underscores need for continued study and suggests directions for future research to improve the Bangladesh population problem.

World Bank Staff Working Paper No. 557. 1983. 176 pages.

ISBN 0-8213-0150-0. Stock No. WP 0557. $5.



Population and Poverty in the Developing World

Nancy Birdsall

Staff Working Paper No. 404. 1980. 96 pages (including 2 appendixes, bibliography).

Stock No. WP 0404. $3.

Population Policy and Family Planning Programs: Trends in Policy and Administration

Kandiah Kanagaratnam and Catherine S. Pierce

Staff Working Paper No. 447. 1981. 80 pages (including bibliography, appendixes).

Stock No. WP 0447. $3.

NEW

hort-term Population rojection, 1980-2020 and Long-rm Projection, 2000 to tationary Stage by Age and ex for All Countries of the Vorld

y T. Vu, under the supervision K. C. Zachariah

his report gives detailed population rojections by age and sex for each ountry at five-year intervals from 1980 2020 and at twenty-five year inter-ls from 2000 to the year in which opulation becomes stationary in each ountry. The implied fertility and mor-lity measures are also given. Revised nually. The 1984 edition will be published as *World Population Projections: Short- and Long-term Projections by Age and Sex for All Countries, with Related Demographic Statistics*

1983. 391 pages.

ISBN 0-8213-0355-4. $30 paperback.

NEW

Rapid Population Growth in Sub-Saharan Africa: Issues and Policies

Rashid Faruqee and Ravi Gulhati

No other country has higher fertility than Kenya and its neighboring countries in Sub-Saharan Africa. This Working Paper examines the reasons for fertility rates staying high, even rising in the face of greater education, falling mortality, and urbanization—factors that tend to lower fertility elsewhere. Calls for a viable population policy and programs appropriate to the culture.

Staff Working Paper No. 559. 1983. 116 pages.

ISBN 0-8213-0152-7. Stock Nos. WP 0559. $5.

Regional Aspects of Family Planning and Fertility Behavior in Indonesia

Dov Chernichovsky and Oey Astra Meesook

Staff Working Paper No. 462. 1981. 62 pages (including appendix, references).

Stock No. WP 0462. $3.

The World Bank
Publications Order Form

SEND TO: **YOUR LOCAL DISTRIBUTOR** OR TO **WORLD BANK PUBLICATIONS**
(See the other side of this form.)
P.O. BOX 37525
WASHINGTON, D.C. 20013 U.S.A.

Date _____

Name _____

Title _____

Firm _____

Address _____

City _____ State _____ Postal Code _____

Country _____ Telephone (_____) _____

Purchaser Reference No. _____

Ship to: (Enter if different from purchaser)

Name _____

Title _____

Firm _____

Address _____

City _____ State _____ Postal Code _____

Country _____ Telephone (_____) _____

Check your method of payment.
Enclosed is my ☐ Check ☐ International Money Order ☐ Unesco Coupons ☐ International Postal Coupon.
Make payable to World Bank Publications for U.S. dollars unless you are ordering from your local distributor.

Charge my ☐ VISA ☐ MasterCard ☐ American Express ☐ Choice. (Credit cards accepted only for orders addressed to World Bank Publications.)

_____ _____ _____
Credit Card Account Number | Expiration Date | Signature

☐ Invoice me and please reference my Purchase Order No. _____.

Please ship me the items listed below.

Stock Number	Author/ Title	Customer Internal Routing Code	Quantity	Unit Price	Total Amount $

All prices subject to change. Prices may vary by country. Allow 6–8 weeks for delivery.

Subtotal Cost $_____

Total copies _____ Air mail surcharge if desired ($2.00 each) $_____

Postage and handling for more than two complimentary items ($2.00 each) $_____

Total $_____

Thank you for your order.

Distributors of World Bank Publications

ARGENTINA
Carlos Hirsch, SRL,
Attn: Ms. Monica Bustos
Florida 165 4° piso
Galeria Guemes
Buenos Aires 1307

AUSTRALIA, PAPUA NEW GUINEA, FIJI, SOLOMON ISLANDS, WESTERN SAMOA, AND VANUATU
The Australian Financial Review Information Service (AFRIS)
Attn: Mr. David Jamieson
235-243 Jones Street
Broadway
Sydney, NSW 20001

BELGIUM
Publications des Nations Unies
Attn: Mr. Jean de Lannoy
av. du Roi 202
1060 Brussels

CANADA
Le Diffuseur
Attn: Mrs. Suzanne Vermette
C.P. 85, Boucherville J4B 5E6
Quebec

COSTA RICA
Libreria Trejos
Attn: Mr. Hugo Chamberlain
Calle 11-13, Av. Fernandez Guell
San Jose

DENMARK
Sanfundslitteratur
Attn: Mr. Wilfried Roloff
Rosenderns Alle 11
DK-1970 Copenhagen V.

EGYPT, Arab Republic of
Al Ahram
Al Galaa Street
Cairo

FINLAND
Akateeminen Kirjakauppa
Attn: Mr. Kari Litmanen
Keskuskatu 1, SF-00100
Helsinki 10

FRANCE
World Bank Publications
66, avenue d'Iéna
75116 Paris

GERMANY, Federal Republic of
UNO-Verlag
Attn: Mr. Joachim Krause
Simrockstrasse 23
D-5300 Bonn 1

HONG KONG, MACAU
Asia 2000 Ltd.
Attn: Ms. Gretchen Wearing Smith
6 Fl., 146 Prince Edward Road
Kowloon

INDIA
UBS Publishers' Distributors Ltd.
Attn: Mr. D.P. Veer
5 Ansari Road, Post Box 7015
New Delhi 110002
(Branch offices in Bombay, Bangalore, Kanpur, Calcutta, and Madras)

INDONESIA
Pt. Indira Limited
Attn: Mr. Bambang Wahyudi
Jl. Dr. Sam Ratulangi No. 37
Jakarta Pusat

IRELAND
TDC Publishers
Attn: Mr. James Booth
12 North Frederick Street
Dublin 1

ITALY
Licosa Commissionaria Sansoni SPA
Attn: Mr. Giancarlo Bigazzi
Via Lamarmora 45
50121
Florence

JAPAN
Eastern Book Service
Attn: Mr. Terumasa Hirano
37-3, Hongo 3-Chome, Bunkyo-ku 113
Tokyo

KENYA
Africa Book Services (E.A.) Ltd.
Attn: Mr. M.B. Dar
P.O. Box 45245
Nairobi

KOREA, REPUBLIC OF
Pan Korea Book Corporation
Attn: Mr. Yoon-Sun Kim
P.O. Box 101, Kwanghwamun
Seoul

MALAYSIA
University of Malaya Cooperative Bookshop Ltd.
Attn: Mr. Mohammed Fahim Htj Yacob
P.O. Box 1127, Jalan Pantai Baru
Kuala Lumpur

MEXICO
INFOTEC
Attn: Mr. Jorge Cepeda
San Lorenzo 153-11, Col. del Valle,
Deleg. Benito Juarez
03100 Mexico, D.F.

MIDDLE EAST
Middle East Marketing Research Bureau
Attn: Mr. George Vassilou
Mitsis Bldg. 3
Makarios III Avenue
Nicosia
Cyprus
(Branch offices in Bahrain, Greece, Morocco, Kuwait, United Arab Emirates, Jordan)

NETHERLANDS
MBE BV
Attn: Mr. Gerhard van Bussell
Noorderwal 38,
7241 BL Lochem

NORWAY
Johan Grundt Tanum A.S.
Attn: Ms. Randi Mikkelborg
P.O. Box 1177 Sentrum
Oslo 1

PANAMA
Ediciones Libreria Cultural Panamena
Attn: Mr. Luis Fernandez Fraguela R.
Av. 7, Espana 16
Panama Zone 1

PHILIPPINES
National Book Store
Attn: Mrs. Socorro C. Ramos
701 Rizal Avenue
Manila

PORTUGAL
Livraria Portugal
Attn: Mr. Antonio Alves Martins
Rua Do Carmo 70-74
1200
Lisbon

SAUDI ARABIA
Jarir Book Store
Attn: Mr. Akram Al-Agil
P.O. Box 3196
Riyadh

SINGAPORE, TAIWAN, BURMA
Information Publications Private, Ltd.
Attn: Ms. Janet David
02-06 1st Floor, Pei-Fu Industrial Building
24 New Industrial Road
Singapore

SPAIN
Mundi-Prensa Libros, S.A.
Attn: Mr. J.M. Hernandez
Castello 37
Madrid

SRI LANKA AND THE MALDIVES
Lake House Bookshop
Attn: Mr. Victor Walatara
41 Wad Ramanayake Mawatha
Colombo 2

SWEDEN
ABCE Fritzes Kungl, Hovbokhandel
Attn: Mr. Eide Segerback
Regeringsgatan 12, Box 16356
S-103 27 Stockholm

SWITZERLAND
Librairie Payot
Attn: Mr. Henri de Perrot
6, rue Grenus
1211 Geneva

TANZANIA
Oxford University Press
Attn: Mr. Anthony Theobold
Maktaba Road, P.O. Box 5299
Dar es Salaam

THAILAND
Central Department Store, Head Office
Attn: Mrs. Ratana
306 Silom Road
Bangkok

Thailand Management Association
Attn: Mrs. Sunan
308 Silom Road
Bangkok

TUNISIA
Société Tunisienne de Diffusion
Attn: Mr. Slaheddine Ben Hamida
5 Avenue de Carthage
Tunis

TURKEY
Haset Kitapevi A.S.
Attn: Mr. Izzet Izerel
469, Istiklal Caddesi
Beyoglu-Istanbul

UNITED KINGDOM AND NORTHERN IRELAND
Microinfo Ltd.
Attn: Mr. Roy Selwyn
Newman Lane, P.O. Box 3
Alton, Hampshire GU34 2PG
England

UNITED STATES
The World Bank Book Store
600 19th Street, N.W.
Washington, D.C. 20433
(Postal address: P.O. Box 37525
Washington, D.C. 20013, U.S.A.)

Baker and Taylor Company
501 South Gladiola Avenue
Momence, Illinois, 60954

380 Edison Way
Reno, Nevada, 89564

50 Kirby Avenue
Somerville, New Jersey, 08876

Commerce, Georgia 30599

Berman Associates
9730-E George Palmer Highway
Lanham, Maryland, 20761

Blackwell North America, Inc.
1001 Fries Mill Road
Blackwood, New Jersey 08012

Sidney Kramer Books
1722 H Street, N.W.
Washington, D.C. 20006

United Nations Bookshop
United Nations Plaza
New York, N.Y. 10017

VENEZUELA
Libreria del Este
Attn. Mr. Juan Pericas
Avda Francisco de Miranda, no. 52
Edificio Galipan, Aptdo. 60.337
Caracas 1060-A

IBRD 18627

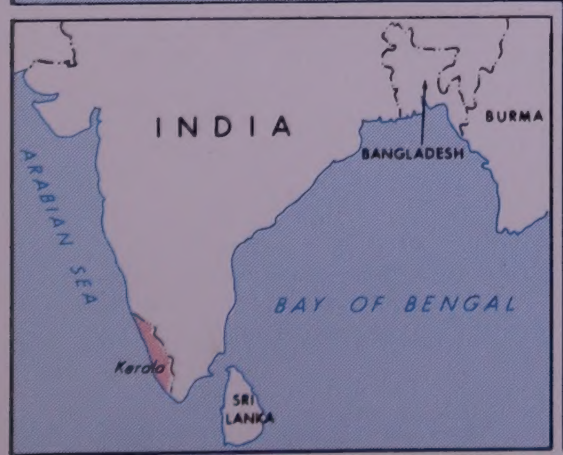
INDIA
KERALA
FERTILITY SURVEY DISTRICTS

To Mangalore
Manjeswar
Kasaragod
Bekel
Hosdrug
To Mercara
To Virarajendrapet
CANNANORE
Taliparamba
Cannanore
Tellicherry
Badagara
To Mysore
Mammantoddy
Nadapuram
Sultans Battery
Perambra
Tamarasseri
KOZHIKODE
To Ootacamund
Gudalur
Nilambur
Wandur
Calicut
MALAPPURAM
Manjeri
Malappuram
Tirur
Kuttirpuram
Ponnani
Mannarghat
To Coimbatore
PALGHAT
To Coimbatore
Shoranur
Palghat
Cheruthuruthy
Kunnamkulam
Guruvayur
Nemmara
Thattamangalam
Kollengode
TRICHUR
Trichur
Peringalkuthu
Shalayar
To Udumalpet
Irinjalakuda
Cranganore
Chalakudi
Angamali
Koladi
Perumbavoor
IDUKKI
Mattupatty
Munnar
Devicolam
Alwaye
Chithirapuram
ERNAKULAM
Botgatty
Ernakulam
Muvattupuzha
Kallarkutty
Thodupuzha
Vazhathope
Kulamavu
To Madurai
Moolamattam
KOTTAYAM
Kottayam
Thekkadi
Peermade
Changanacherry
Edapalayam
Alleppey
Thiruvalla
Pamba
Anathode
Sabarigiri
Chengannur
Mavelikara
Adur
Kayamkulam
QUILON
Punalur
To Madras
Shencottah
Kottarakara
Quilon
Ponmudi
Attingal
Varkala
TRIVANDRUM
Aruvikara
Neyyar Dam
To Thirunelveli
Trivandrum
Neyyattinkara
Kovalam
Padmanabhapuram
Cape Comorin

ARABIAN SEA

Survey Districts
Roads
Railways
Cities and Towns
District Capitals
District Boundaries
State Boundaries
International Boundaries

0 25 50 75 100
KILOMETERS



76°
77°
12°
11°
10°
9°

NOVEMBER 1984

The World Bank

Headquarters
1818 H Street, N.W.
Washington, D.C. 20433, U.S.A.

Telephone: (202) 477-1234
Telex: WUI 64145 WORLDBANK
RCA 248423 WORLDBK
Cable Address: INTBAFRAD
WASHINGTONDC

European Office
66, avenue d'Iéna
75116 Paris, France

Telephone: (1) 723-54.21
Telex: 842-620628

Tokyo Office
Kokusai Building
1-1 Marunouchi 3-chome
Chiyoda-ku, Tokyo 100, Japan

Telephone: (03) 214-5001
Telex: 781-26838

ISSN 0253-2115/ISBN 0-8213-0439-9